GAS JOURNAL, AUGUST 2, 1939

VOL. 227. 91st YEAR. No. 3976.

Editorial Notes

Ireland's Eye

WHILE feasting upon the beauty of some outstanding view of the Irish coast-line, we remember to have heard on more than one occasion the exclamation, "Ah! that is Ireland's Eye." In saying there has been more than one occasion, there is no intention of implying that the name of "Ireland's Eye" has ever been applied to more than one particular island; doubtless it is the same view that was being devoured each time the exclamation was heard. But, if not to another island, there is something else to which, so far as the Gas Industry is concerned, the name of "Ireland's Eye" may appropriately be given.

The Gas Industry of Ireland is fortunate to possess for its "Eye" an Association whose record for downright, slogging, hard work, under circumstances which at times, it must be confessed, have presented little of encouragement, should be held to warrant the active support of everyone connected with the Industry. It is a possession of value according to its completeness. There should be nothing missing from "Ireland's (Gas) Eye," the absence of which might detrimentally affect its functioning. The Gas Industry of Ireland—just as does that of England, Scotland, and Wales—needs for its completest development, for its highest stage of prosperity, absolute unanimity of sight, of thought, of speech, and of action. The Irish Association, as representing locally the country's Gas Industry, can be assured of possessing this unanimity (or of convincing others that they possess it) only by 100% representation, and those who are striving—and have for years striven—not only to maintain, but to increase, the usefulness of the Association would doubtless feel that their efforts had been fully rewarded only by the active support of every gas undertaking.

This year the Association "took a chance" by altering the date of the meeting from August, which had long been the time chosen, to July, in the hope of securing a more representative attendance, but, if anything, the number present was smaller than usual. At any rate, a good many familiar faces seemed to be missing. So for next year's meeting, one may expect a return to August. And then, what? Let us hope for a bumper attendance, and a swelling of the membership roll which will focus the attention of the passer-by upon "Ireland's (Gas) Eye," and add to the authority and the dignity of the Association. Though it has nothing to do with the argument now being advanced, it may be said that absentees missed a very enjoyable meeting last week, and one which breathed a message of encouragement for the future.

The name of Anderson, of course, is a "household word" in the Gas Industry of Ireland, and one learned during the proceedings something of the secret which has spelt success in the control of undertakings by a family who have been associated with gas in that country for close upon a century. Yet, why describe it as a "secret," when it stands out so clear that "who runs may read?" Happy relationships between employer and employed pay good dividends—or there is something wrong somewhere. At any rate, if profit does not accrue in this way, it is little likely to do so through the adoption of any other policy. The present active representative of the family, Captain George Anderson, who undertook the duties of Acting President at this meeting (consequent upon the untimely death of the President, Mr. F. G. McElwee, of Coleraine), gave evidence, both in his conduct of the business proceedings and in the generous hospitality extended by him during the day, of having inherited to the full the "happy family" spirit of his father and his grandfather, who preceded him in the control of Irish gas undertakings.

His Presidential Address, too, struck a note of encouragement, inasmuch as he pointed to the advances that have been made by the Industry during the past 33 years—the period that has elapsed since his father was President of the Association. In 1906 the annual make of gas in Ireland was just under 5,000 million cu.ft.; in 1938, it was practically double, at 10,000 million cu.ft. In the same time, consumers have increased from 134,000 to 339,000; and the number of cookers in use, from 26,500 to over 241,000. Not astronomical figures, perhaps—certainly not results such as would justify any relaxation of effort—but a tale of solid progress, full of good omen for the future. None can say now what the story will be at the end of another 33 years; but we can tread the path ahead with confidence—always remembering that "unity is strength."

Research on Tar

THE trend of modern road tar research and its anticipated influence on road practice was the subject of an interesting and provocative Paper by Mr. D. W. Parkes, of Midland Tar Distillers, Ltd., at the recent International Road Tar Conference held in Brussels. It may be recalled that the idea of holding these International Conferences was conceived in 1931. Their success—and there can be no question that they are serving a most useful purpose in disseminating knowledge and bringing together those working in the same field—has been largely due to the hard work put in by Mr. W. E. Cone, of the British Road Tar Association. Now Mr. Parkes and his colleagues are carrying out very important research in an attempt to correlate tests on tar in the laboratory with its behaviour when applied to the road. There could not, we think, be a task much more involved, for so many factors come into play which affect the durability of road tar—such factors as atmospheric temperature, temperature of the road, humidity, wind, ultra-violet light, type and volume of traffic, and, most important, method of application.

To our mind, laboratory research into the properties of tar is far in advance of what may be termed research on the craftsmanship of road-making. A technique of application is being developed, but there is still too much "hit and miss" about road-making and surfacing. In this development of application technique the British Road Tar Association has done and is doing excellent work, as a result of which contractors and surveyors are becoming more responsive to new ideas and more willing to adapt scientific method to what is essentially a scientific process. But much remains to be done. We know of instances where precisely the same material was handled on the one hand by workers operating under strict supervision, and on the other hand by untrained workers operating without any due control. In the first case the results have been completely successful; in the second, failures have been the order of the day. Mr. Parkes himself was at pains to point out that even with the perfect road binder, success is possible only by accurate control during mixing and application. More failures are due to poor technique in using tar than to faulty methods in its preparation.

The Author put forward in no uncertain terms criticism of the existing standard specifications for road tar. Most specifications lay down limits of specific gravity, naphthalene content, and matter insoluble in benzene; "but," he observed, "the connexion between these properties and performance under any given conditions has never been explained, because no serious attempt has ever been made to correlate these properties with performance." We suggest, however, that much serious work has been done—again notably by the British Road Tar Association—in determining those characteristics in tars which make some of more value than others in a particular type of construction. Progress has been made in understanding the changes in the properties of tar due to exposure. Trials have been made on the road to compare with road behaviour various laboratory performance tests on tars. These trials have already occupied several years. And we think that the standard specifications have served a useful purpose in bringing about greater uniformity and in eliminating to a large extent unsuitable tars. To-day tars which may be regarded as being in advance of the specifications are being applied to the roads, and doubtless the research in progress will result in an improvement in the existing standard specifications for road tar.

It is obviously desirable to continue with research aiming at standard laboratory tests by which the behaviour of tar in actual use on the roads can be confidently predicted without the necessity for carrying out long-term trials of the material under traffic conditions, and the highly interesting work of Mr. Parkes and his colleagues is to be welcomed and encouraged. The Author has sought to discover a single test, the results of which would embrace all those properties of a road binder which contribute to its durability. Retention of ductility has been the basis of the "rubber strip test" which has been developed in the laboratories of the Midland Tar Distillers. A film of tar is automatically spread on a rubber strip and submitted to any form of weathering desired. The film is then elongated 35% in a cabinet which can be cooled to —25° C. or heated to 50° C. The temperature at which the film cracks is determined, and from this "critical temperature" conclusions are drawn as to the likely behaviour of the tar on the road. This simple line of attack has fascination, and if further work proves the positive nature of the method it may well lead to a change in the type of standard specifications. In the future viscosity of tar may be regarded as a small and unimportant item. Future specifications may deal with setting time, quantitative loss on exposure, ductility of residue on exposure in relation to temperature, and healing properties of the binder after exposure.

But this is only part, though an important part, of the building-up of a general technique of road-making—the application of scientific principles and standardization to road design. To-day practice is ahead of scientific knowledge, though more and more it is being realized by the highway engineer that, properly prepared and properly applied, no better material can be had for road binding purposes than tar.

Status of Gas Stocks

THE fact that no less than 94% of the recent stock issue of the London County Council was left on the hands of the underwriters indicates the reluctance of the investing public to invest even in those securities which may be regarded as gilt-edged. This reluctance is reflected in the downward trend of investments, a tendency which is general, and is noticeable even in the Gas Industry.

Such reluctance is at the present time understandable. There is the unsettled political situation, which involves the fear of a rapid rise in the cost of raw materials, particularly coal, and in addition the heavy sums which will have to be spent in connexion with air raid precautions work. To this is added the danger to which all forms of property are liable in the event of hostile attack from the air. There is no doubt that vast sums of money are awaiting investment, and it would be to the good of the community and of industry if these sums could be placed at the disposal of our essential services. In war there would be no more essential industry than the Gas Industry, particularly as the potentialities of its residuals for war purposes are practically unlimited.

The advantages of gas stock to the prudent investor have become increasingly apparent. There can be no stock on the market to-day which gives a more reasonable return combined with complete security. At the time of the passing of the Trustee Act in 1925 an attempt was made to induce the Government to include gas stock in the list of Trustee Investments. In the fourteen years which have elapsed, the case for such inclusion has become even stronger. The present list of Trustee Investments tends to become more and more restricted, particularly since the various stocks of the Railway Companies have lost their Trustee status. The present position of Trustee Investments is such as to increase the difficulties of Trustees, who are restricted to such investments, and are at the same time forced to obtain some income for those who depend upon them. The debenture and preference stock of statutory water companies, which have during the last ten years paid not less than 5% on their ordinary stock, have long enjoyed Trustee status, although rather absurdly, where a company with undivided capital owns both a gas and water undertaking, it is questionable whether its stock would be available to Trustees. There appears to us to be no reason why a similar status should not be conferred upon the debenture and preference stock of gas undertakings, and if this suggestion were adopted there can be little doubt that both the Industry and the investing public would benefit.

The tendency towards amalgamation, which has been blessed by so many official reports, would undoubtedly be greatly assisted. Shares of many of the smaller gas companies are held by Trustees, who are precluded at present from exchanging any of the investments contained in the Trust for other than Trustee securities. A Trustee holding such stock may receive a tempting offer from a larger gas company which desires to obtain a controlling interest in the smaller company. The Trustee is unable to take advantage of such a favourable offer because the securities offered in exchange for those contained in the Trust are not available to him as a Trustee. In an extreme case, where a majority of the shares of a small gas company were held by Trustees who were limited to Trustee Investments, the attempt of a large gas company to obtain a controlling interest would be bound to fail. In other cases, where the small gas company is to lose its existence and be merged in the larger undertaking, a Trustee would be precluded from accepting shares in the larger undertaking, and would be forced to receive cash, which to-day he would have small opportunity of investing profitably. In our view, the extension of Trustee status to gas debenture or preference stock is particularly desirable at the present time, when money is urgently required for air raid precautions, and is notoriously difficult to obtain.

Fortunately, there are definite signs that the value of gas stock is becoming increasingly appreciated in Government quarters. For instance, their Building Societies (No. 2) Bill, the object of which is to ensure the financial stability of building societies, provides that only Trustee investments shall be accepted as security additional to that of the house to which the advance relates. The Bill provides, however, that in certain circumstances gas stock may be offered as such an additional security. Even more interesting is the fact that the House of Commons (Members Fund) Bill, the object of which is to provide pensions for Members of Parliament and their widows, provides that the fund to be formed may be invested in the preference stock or preference shares of any statutory gas company which has paid a dividend on its ordinary stock of not less than 3% during each of the five years immediately preceding the date of investment. The fact that Members are apparently willing to entrust their superannuation fund to the Gas Industry may indicate that a new attempt to obtain financial status for gas stock would be more favourably received than formerly.

Competition at Walsall

Walsall Gas Department has not had an easy year. Sales of gas fell by 26 million cu.ft. and the cost of coal rose by practically £3,500. Financially there was a net loss of £2,362, compared with a profit of £14,659 in the previous year. Slum clearance, the removal of thousands of lighting consumers to new municipal houses where electric light is installed, has been a major cause in decreased sales. Actually, sales from prepayment meters were down by £8,000. Discussing the matter, Alderman Dean, Chairman of the Gas Committee, said at this month's meeting of the Walsall Town Council that the Gas Department admitted that electricity was more useful for lighting purposes.

This was a strange admission. Every time a gas undertaking fixes a gas light in a poor home it automatically includes the free use of a background heater; poor people cannot really afford to exchange gas light for electric light. Nor can they afford to substitute electricity for gas for cooking. Invasion of the gas cooking load was another point touched on by Alderman Dean, who spoke of the intensive canvassing carried on by the electricity undertaking, which is also owned by the Corporation. The Gas Department spends money in providing mains and fittings to install cookers. The canvassers in some instances persuade consumers to use electricity for cooking. The gas cookers are taken away, which costs money. Then, after a short period, the Gas Department is requested by many who have sampled electricity, much to their cost, to replace electric cookers by gas cookers, which again means expenditure. We are not afraid of competition, but this is a very wasteful variety. And the Gas Undertaking is not helped by having to contribute heavily to relief of rates. Last year it paid £11,256 in rates; altogether it has contributed from its profits £184,000 in this way, which, it will be admitted, is a bit of a handicap. However, the industrial gas load "shows a promising future;" and doubtless Alderman Dean took due note of the comments of Councillor Tibbits, Chairman of the Electric Supply Committee, at the same meeting of the Town Council to the effect that the new two-part prepayment meters had been the main feature of the domestic electrical development in the town during the past two years. The Walsall Gas Undertaking has an excellent works, new plant having been installed in 1936. It has modern showroom premises and also a mobile showroom which, in the words of Alderman Dean, has been "remarkably successful and has created a substantial number of sales around the district." Given attractive rates for gas it should look with confidence to the future and not be unduly pessimistic about the "remorseless" competition from electricity.

University Course in Refractory Materials

The importance of refractory materials, their bearing on production costs and life of plant, to fuel using and treating industries increases year by year. In the Gas Industry the advances made in the manufacture of refractories have made possible carbonization at elevated temperatures, increased throughputs, and longer working life of settings. As their manufacture becomes more scientific, so does the user need to have a scientific appreciation of their qualities, their merits and their limitations, if he is to employ them to the best advantage. At Leeds University a great deal of helpful research work on refractories has been carried out, and instruction in the subject has formed part of the courses of the students reading for Degrees in Gas Engineering and in Fuel and Metallurgy. As announced in our news pages, however, a new move has been made to cater more specifically for the specialized needs of to-day. To meet the growing demand for men with special training in refractory materials a one-year course has been instituted by the University leading to a post-graduate Diploma in Fuel and Refractory Materials. This course will commence in October next and will be given in the Department of Coal Gas and Fuel Industries. As a preliminary qualification an approved Degree in Science or Technology is required. The move is to be welcomed, and we feel that it will benefit both the manufacturers and the users of refractories in making available men with special knowledge of the subject.

The White City Estate

At the London County Council's new housing estate at the White City, recently opened by Mr. Walter Elliot, Minister of Health, gas has a particularly good show—and the Publicity Department of the B.C.G.A. has not missed the opportunity to put across its story. The newest issue of "A Thousand and One Uses for Gas" has been given over entirely to a pictorial record of the White City estate, to which is added a note on housing in general and the part which the Gas Industry can play in it in particular.

Entitled "A Town is Born," this issue tells in text and picture a story which is important to every member of the Gas Industry concerned with housing. It draws the moral of Kensal House and shows how the L.C.C. has taken a first step towards adopting the gas and coke plan for smokeless homes at the White City. For there the Council has in some flats fitted up gas-ignited coke grates in the living-rooms in addition to gas appliances in the other rooms. Of particular interest is the fact that each of the 1,200 flats just opened is equipped with a Ewart multipoint water heater, while by special arrangement made between the L.C.C. and the Gas Light and Coke Company the tenants of a number of flats will be able to have installed gas refrigerators at a cost (including hire of appliance, maintenance, and gas consumed) of only 1s. a week. This sum will be collected with the rent by the Council, which receives an allowance of 5% for cost of collection.

The striking show which gas makes in these modern flats—which when complete will house some 11,000 people on 52 acres of land—has been very favourably commented on in the national Press. One paper—the *Daily Herald*—reproduced a full page of pictures from "A Town is Born," with illustrations of a gas water heater and refrigerator, &c. Regrettably, the Council has decided to install in a number of the cheaper flats the old-fashioned coal coppers; but, for the greater number of flats, gas is ready to give good service both in individual homes and in communal wash rooms, which are provided with deep sinks and coppers with water heated through separate gas meters.

Research on Coke

The grants from the Department of Scientific and Industrial Research and from the Research Committee of King's College, Newcastle, which enabled the Northern Coke Research Committee to purchase X-ray equipment, has greatly extended the possible range of the Committee's investigations. In a relatively short time this new method of studying coals and coke has yielded most interesting results, which should prove of great value to the carbonizing industries. The work is an admirable example of long-term research carried out in a modest way at very little expenditure. The new technique represents a method of attack which seems likely to supply much needed information concerning the carbonization process and the fundamental structures of coals and cokes. To the published accounts of the work already accomplished we have referred in the "JOURNAL." In February of this year, for example ("JOURNAL" for February 8), we gave a special article on the Jubilee Memorial Lecture delivered under the auspices of the Society of Chemical Industry, by Professor H. L. Riley, Director of Research of the Northern Coke Research Committee. As a result of the X-ray method he corroborated the findings of others working on different lines regarding the effect of the critical carbonizing temperature of 700° C. on the structure and properties of the coke produced. The progress made in this systematic X-ray study of carbonaceous materials undertaken at Newcastle is outlined in the Committee's Report for 1938, which has just been published. The report points out that although sufficient data have not yet been accumulated to permit of any generalizations, the results already obtained give promise of a much deeper insight into the nature of these substances and of the carbonization process. We look forward to the more comprehensive picture which is promised in the near future.

Effect of Forceful Propaganda

Before now we have expressed admiration of the energy and the business acumen exercised by Colonel W. A. Bristow in directing the affairs of Low Temperature Carbonisation, Ltd., and expanding on a sound basis the Company's activities. At the annual meeting recently he explained the reasons that prevented the Company from paying a dividend this year. During the past two years the Company has been engaged in the construction of large works which did not reach the earning stage last year. A new oil refinery was brought into operation, and much research and propaganda work was undertaken. The output of "Coalite" from the three works in the North reached its maximum at a time when the weather conditions for the fuel industries were the worst ever recorded. Stocks of "Coalite" assumed proportions which gave rise to anxiety. An extensive national advertising campaign was thereupon embarked upon and the sales organization expanded. This cost money, but the expenditure has been written off. And the results? The demand created absorbed all stocks and full production capacity. This summer, said Colonel Bristow, the Company has been carbonizing 6,500 tons of coal per week, all the "Coalite" is being dispatched as made, and it has not been possible to store one ton since May 1. This constitutes yet another proof of the effect of forceful publicity, and the results might well be noted by gas undertakings which may have coke in store. They certainly show that the public does appreciate a smokeless fuel.

Personal

Presentations of long-service awards were made at a meeting of the Birmingham Corporation Gas Committee on July 24 on the retirement of Mr. G. M. LEWIS, who has been with the Gas Department for 43 years, and Mr. W. E. CADWALLADER, who has completed 45 years' service, and at the time of his retirement was Technical Assistant to the Fittings Superintendent. Mr. Lewis was appointed Controller of Gas Sales to the City of Birmingham Gas Department on the resignation of Mr. R. J. Rogers some seven years ago. Prior to that, he was Showroom Manager for 20 years. Mr. Lewis has been responsible for the initiation and conduct of successful selling campaigns and the organization of a number of new Branch Showrooms and Fittings Depots in the Birmingham area.

Mr. G. M. Lewis

The awards took the form of an illuminated address in album form and were presented by Councillor A. S. Giles, Chairman of the Gas Committee.

As Mr. Lewis's successor in the position of Controller of Gas Sales, the Gas Committee have appointed Mr. W. L. S. SPINKS, who previously held the position of Fittings Superintendent. Mr. Spinks is well-known in the Gas Industry, more especially in connexion with the organization of the Gas Section at the British Industries Fair and for his keen interest in the educational work, particularly of gasfitters.

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Mr. DAVID BEAVIS, Technical Assistant to the Helensburgh Gas Department, has been successful in obtaining from The Institution of Mechanical Engineers the Higher National Certificate in Mechanical Engineering, with distinction in Motive Power Engineering and General Design. He has also gained the National Certificate Prize. Mr. Beavis received his early training in the service of the Glasgow Corporation Gas Department, and has been serving in his present capacity at Helensburgh for the past three and a half years.

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MR. FRANK WALTON MIDDLETON has been elected to the Board of the Wharncliffe Silkstone Colliery Co., Ltd., of Barnsley. His father, Major Frank Middleton, is Deputy Chairman and Managing Director of the Company.

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The Chairman of the Lincoln Gas Committee, Councillor A. L. BOWER, has been invited to accept the office of Mayor of Lincoln for the coming year.

The late Mr. CHARLES DRU DRURY, a Director and former Chief Engineer of the Sunderland Gas Company, who died on April 25, left £10,511, with net personalty £7,773.

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Mr. A. B. BRITTON, Engineer, Manager, and Secretary of the Hinckley Gas Department, has been elected President for the ensuing year of the Hinckley Rotary Club.

Obituary

We regret to announce the death of Mr. VERNON HEYWOOD STOTT, Managing Director of Messrs. James Stott & Co. (Engineers), Ltd., Vernon Works, Oldham, the well-known Hotel, Restaurant, and Canteen Equipment Engineers, with whom he had been associated for nearly 50 years. Until a few years ago, Mr. Stott had retained an active interest in the Oakwood Park Hotel, Conway, North Wales, and was well-known in Hotel and Engineering circles throughout the country. Mr. Stott passed away suddenly at his Prestatyn residence on Wednesday, July 26.

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Mr. JOHN STRONG, formerly Secretary to the Wigton (Cumberland) Gas Light & Coke Co., Ltd., and a well-known county solicitor, has died within a few days of his 75th birthday.

Tar Carpets

A well-attended meeting of the Cumberland Surveyors' Association was held on July 22 at the Town Hall, Maryport. The President, Mr. G. O. Lockwood, M.Inst.C.E., County Surveyor of Cumberland, occupied the chair.

The members first inspected a tar carpet laid by the hot-process in Lower Church Street. This further development of the British Road Tar Association's work on tar carpets was the subject of a brief review by Mr. W. E. Cone, Technical Adviser to the Association, who also handed round copies of the Specification to the members. Facilities for the laying of this carpet were kindly provided by Mr. R. Williams, Surveyor of Maryport, and considerable interest was evinced by the members in this type of construction.

The members proceeded to the Town Hall, where two Papers—one by Major C. Irwin, of the West Cumberland By-Products Company, Ltd., Flimby, on "Improvements in the Preparation and Use of Road Tar in Recent Years," and the other by Mr. W. E. Cone on "Tar Carpets," were presented for discussion.

A vote of thanks to the Authors was proposed by Mr. Lockwood, seconded by Mr. T. Bowes. A number of members took part in the discussion.

Tea was provided at the Waverley Hotel, Maryport. At its conclusion, Mr. Lockwood proposed a vote of thanks to Mr. Williams for providing such an interesting and instructive visit.

Letters to the Editor.

Expansion Nipple.

SIR,—I have read with interest the article on p. 111 of your issue of July 12 describing the adaptation of the expansion-nipple to spun pipes. As the research of Mr. A. S. Foster, following the suggestion of Mr. G. M. Gill, has been described in close detail, it may be of interest to link this up with experience of 30 years ago when the expansion-nipple was first introduced. There is sometimes a touch of romance attending a successful invention: Mr. Foster's conclusions have brought him back almost exactly to the point from which the expansion-nipple started. The story is as follows:

I had been laying steel mains for the firm of Corbet Woodall & Son, Consulting Engineers, and was much obsessed by the need of better joints for the pipes themselves, and also for the service connexions. The first was settled by telescoping the tubes in what I termed the "rigid joint," with a short caulking socket. That was afterwards known as the "longsleeve" joint, and adapted for welding. The service connexions were an even more serious matter, as they were holding up the utility of steel mains. I wrote to every firm that appeared in the directory as makers of tube expanders, asking whether they could provide for expanding services into a steel main with thin walls. *One and all turned it down.* In 1907 there were mains and services to lay at the small town of Chagford in the heart of Devon, where, although knowing nothing whatever about tube expansion, I determined to find a way of riveting the services. A local blacksmith made some nipples with a single internal bead, and an external shoulder; and a mandril which was to be forced downwards. As most inventions start crudely, this operation was effected with a sledge hammer without damage to the steel main, pending provision of a mandril that could be drawn up. Now by using a machine clamped to the main, Mr. Foster is able to effect the downward thrust by screw-power.

The question of screw threads was most seriously considered, and we decided to have them for the following reasons: (1) As additional security. (2) To keep the nipple straight while expanding (without a machine), and (3) to gauge the insertion in the main in lieu of the shoulder to which also Mr. Foster has reverted.

For spun pipes with wall thicker than that of the steel tube, and using a machine, it is quite sound to dispense with the screw threads for the very good reasons which Mr. Foster advances, and having regard to the greater accuracy in machining now available as compared with 30 years ago.

The "Du-Ex" nipple, having two internal heads, and external screw threads, was introduced by Messrs. J. Stone and Co., Ltd., after my original patent had run out, and was an ingenious improvement thereon. I take it that Mr. Foster will agree that, so far as steel mains are concerned, no change is necessary; the "Un-Ex" nipple caters for spun pipes.

There still remains the curvature of the pipe as a drawback applicable to any service joint, but that has evidently not troubled Mr. Foster owing to the greater thickness of the spun pipe. All initial experiments were made on a 1 in. service in a 3 in. main, with the result that it was necessary to fit a saddle and packing ring to ensure a sound joint. The "Du-Ex" nipple afterwards passed the drastic test without that addition, and greatly simplified the connexion.

I congratulate Mr. Foster, and am only sorry not to have been present at the demonstration.

Yours, &c.,
B. R. PARKINSON.

Fitzalan Street Works, S.E.11.
July 28, 1939.

Apportionment of Responsibility.

SIR,—Your Editorial Notes under the above heading last week deal with a vital question which concerns every assistant in the Gas Industry, and, as you suggest, some satisfactory basis should be formulated whereby it is made clear as to what a junior's responsibilities are when he accepts a post of Works' Manager responsible to a Chief Engineer.

It can be reasonably contended that when a junior is effecting economies and generally improving the Undertaking, the whole of the credit is taken by the Chief Engineer. In these circumstances, the Chief Engineer cannot divest himself of responsibility should the converse happen, but the "GAS JOURNAL" record an instance of an assistant who improved the efficiency of the works, and yet had to shoulder the major portion of the blame. If the Chief Engineer takes 100% of the credit, it is surely not asking too much to insist that he should take 100% of the blame. This implies that a Chief Engineer should not hesitate in any way to ensure that those immediately responsible to him are fully qualified and capable of carrying out their respective duties to his entire satisfaction.

But if capable and qualified assistants are demanded, then it is surely reasonable for assistants to demand adequate remuneration, and yet a letter appearing in the same issue of the "JOURNAL," under the signature of "Technical Assistant," states that he is receiving a salary of 15s. per week *less* than works charge hands.

If your suggestion is adopted and a committee is set up by The Institution of Gas Engineers to discuss the responsibilities of assistants, then I would suggest that the question of salaries should also be taken into consideration. Both questions are parts of the same problem, and call for investigation.

The respective Junior Gas Associations will no doubt be taking into serious consideration the issues involved, but their present constitution is such that they are hardly in a position to take any drastic action.

Yours, &c.,
July 29, 1939. "LUDDINGTON."

SIR,—I shall be very glad if you will allow me to express my hearty approval of the excellent letter from "Technical Assistant" in your issue of July 26.

While not engaged in the Gas Industry myself, it happens that during the last nine years I have had much to do with many of the technical workers between the ages of 16 and 40 engaged in the manufacture and distribution of gas. I have had unrivalled opportunities of estimating the worth of the young men on whom the future of the Industry largely depends, and have learned to have a great respect and liking for the majority of those with whom I have had to deal. Indeed, it has come as a revelation to me to discover what a very large number of young men of outstanding ability and strength of character have devoted themselves to the cause of gas—in these days when we have had it drummed into us so often that the young men of this country are largely degenerate.

These self-denying young men are content to slave away for years, often with little encouragement of their efforts and scant recognition of their achievements, in order to pass examinations, which are often quite unreasonable in their demands upon the student.

Now the Gas Industry is threatened on all sides with a fierce competition, often of a rather unscrupulous nature, and it has to fight against the much too prevalent idea that the use of coal gas belongs to the past, and is doomed to extinction. Moreover, there are, I believe, still many undertakings that cannot stand up to the competition which assails them, because they manufacture gas of inferior quality by antiquated and wasteful methods, and distribute it by means which are quite inadequate for modern requirements.

In view of this and much more that could be said, I would say to the heads of the Industry: Can you afford to waste any of the ability, energy, and enthusiasm which are offered so freely by the splendid young men who serve you? To "Technical Assistant" I would say: You have good grounds for complaint, but have patience! In ten years from now you may be the highly-paid head of a big undertaking, and where will the charge hand be then? If he is lucky, he will still be a charge hand, and if he is unlucky he will have been thrown on to the scrap heap of unemployment.

Yours, &c.,
WILLIAM BLATCHFORD.

10, Park View, Halifax.
July 31, 1939.

Forthcoming Engagements

Sept.

13.—I.G.E.—Pipes Committee, 2.30 p.m.

21.—S.B.G.I.—Council Meeting, 11.15 p.m.

22.—North of England Association.—Autumn Meeting at Malton.

"Gas Journal" Directory

In order that readers may be able to keep the particulars contained in the "JOURNAL" Directory up to date, we summarize in the following list various changes during the past month:

Page 54. PONTYPOOL. J. Powdrill appointed M. vice T. B. Pearson deceased.
" 56. RAWMARSH. J. Powdrill, E. & M., resigned.
" 80. AUCHTERARDER. R. Stewart, E. & M., resigned.
" 90. LANGHOLM. C. R. Trotter appointed E. & M.
" 92. PAISLEY. S. Smith appointed E. & M. vice A. S. Nisbet retired.
" 94. THURSO. R. Stewart appointed E., M., & S.

News of the Week

A Net Trading Profit of £800 is reported in the annual accounts of the Barnoldswick, Colne, Gas Department.

The North of England Gas Managers' Association will hold their autumn meeting at Malton, under the Presidency of Mr. T. Law, on Sept. 22.

An Auxiliary Gas Lighting system has been installed at Boots, the Chemists, Shrewsbury, by the Shrewsbury Gas Light Company. An automatic mechanism has been fitted which, in the event of electric light failure, brings the gas system into action.

Unaccounted-for Gas is a serious concern of Mr. H. Maycock, Engineer, Manager, and Secretary at Abertillery. In spite, however, of losses during the past year, the consumption figures are the highest since 1924, as will be shown by the annual report. Special recommendations for dealing with the trouble are to be made by the Engineer.

At an Extraordinary General Meeting on June 29 of the members of the Campden Gas, Coal, Coke, and Lighting Co. (1920), Ltd., the Company was renamed Campden Gas Co., Ltd., and the existing rights of certain preference shares were varied. At the same time the capital was increased from £2,500 to £15,000 by the creation of 12,500 new ordinary shares of £1 each.

The Financial Advantages accruing from the utilization of coke oven gas were referred to by Mr. A. E. Ruffhead, Engineer and Manager of the Darlington Gas Department, in a report to the Corporation. The Department's supply of coke oven gas comes from Willington, 16 miles away. Mr. Ruffhead states that the first 12 months under the new system meant a saving to consumers in Darlington of £25,180, of which £13,560 was a saving on charges and £11,620 on the price of coal. Slot meter consumers saved about £5,000 in the year.

Cornwall Claims the Distinction of having had, thanks to William Murdoch, the first house in England to be lighted by gas. Reference to this fact was made at a luncheon at the White Hart Hotel, Launceston, on Friday, July 28, given by the Launceston Gas Co., Ltd., to mark the taking over of the Company by the South Western Gas & Water Corporation. Mr. T. J. Greenwood, Engineer and Manager of the Bodmin Gas Consumers Co., Ltd., proposed the toast of the Borough of Launceston, to which the Mayor, Alderman H. Hoskin, responded. Mr. E. D. Pethybridge, Chairman, replied to the toast of the Launceston Gas Company.

The Next General Meeting of the Southern Association of Gas Engineers and Managers will be held at the Hotel Victoria, London, W.C. 2, on Wednesday, Nov. 8.

The 33rd Annual Convention of the Canadian Gas Association will be held at Jasper Park Lodge, Alberta, Canada, on Wednesday, Thursday, and Friday, July 3, 4 and 5, 1940.

An Extension of Limits of Supply is one of the objects of a Special Order for which the Leicester Corporation Gas Department intend to apply to the Board of Trade under the Gas Undertakings Acts, 1920 to 1934.

A Profit of £1,410 on the past year's working is reported by the Crieff Gas Co., Ltd. From the previous year the sum of £642 is to be brought forward, making a total balance of £2,052, and a dividend of 7½% is being paid.

Gas-Works Extensions by the Johnstone Town Council are to cost £12,200. Two new retorts, making 14 in all, will be installed, and £2,000 will be spent on extending the high-pressure main to Bishopton, where now houses and a factory will be supplied with gas. A new main, costing £1,800, will be laid for this purpose.

The Best and Speediest way of camouflaging Skegness' large gasholder is being considered by Mr. F. Young, Engineer and Manager of the Skegness Gas Department. At a recent meeting of the Gas Committee he was asked to make enquiries and report on the most effective method of camouflaging the gasholder in the event of an emergency.

Labour Costs involved in handling coke and oxide at the Clitheroe Corporation Gas Works have been considered by the Gas Committee, and Mr. R. W. Harris, Engineer and Manager, has submitted an estimate of the cost of installing suitable machinery for the work. He has been requested to obtain comparative costs of providing new and second-hand machines for this purpose.

At Two Carnivals the Cannock District Gas Company were successful with an entry featuring "New World," "Regulo"-controlled cookers. The theme was "keep that schoolboy appetite and install a 'New World' gas cooker." Four schoolboys on the car, with the proverbially healthy appetites, were eating enormous pies. The awards received were first prize and the Steer Challenge Cup for the best tradesman's display at Brownhills, and first prize for the same class at Hednesford.

The Gas Research Board.

Officers and Members Announced.

The Council of the newly-formed Gas Research Board held its first meeting at Gas Industry House, on Tuesday, July 25, 1939. Mr. E. V. Evans was elected Chairman.

It was reported that the first President of the Gas Research Board would be Sir David Milne-Watson, Bart., LL.D., D.L.

The appointment of the Secretary of The Institution of Gas Engineers as the first Secretary of the Board was confirmed.

Consideration was given to, inter alia, the principles and programme of work of the Board and to the appointment of a Director of Research.

The Members of Council of the Gas Research Board nominated by the Institution and the Society of British Gas Industries are:

E. Crowther, M.Eng., Assoc.M.Inst.C.E. (Newcastle-upon-Tyne).
J. E. Davis, A.I.C. (London).
George Dixon, B.Eng., M.Inst.C.E. (Nottingham).
E. V. Evans, O.B.E., F.I.C. (London).
A. G. Grant, M.Sc. (Darlington).
Harold Hartley, D.Sc. (London).
D. M. Henshaw (Huddersfield).
H. Hollings, D.Sc., F.I.C. (London).
Stephen Lacey, B.Sc., M.Inst.C.E. (London).
C. A. Masterman, M.A., F.I.C. (London).
T. F. E. Rhead, M.Sc., F.I.C. (Birmingham).
R. J. Rogers (Birmingham).
E. W. Smith, C.B.E., D.Sc., F.I.C. (London).
Harold C. Smith, J.P., M.Inst.C.E. (London).
Ernest West, M.I.Mech.E. (Manchester).

Gas Fire Fortnight.

Autumn and Winter Campaign.

The B.C.G.A. has decided to hold gas fire fortnight from Sept. 25 to Oct. 7. This will be followed almost immediately by the autumn and winter campaign, which will deal with the heating of homes by gas and coke. Full particulars of both campaigns will be available shortly.

Novel Demonstrations at Southampton.

A novel and interesting series of Cookery Demonstrations have just been held in the Southampton Company's new Demonstration Theatre. These lectures are a new type which have been introduced into the Radiation series of Cookery Demonstrations and are called "Cakes from Other Lands" and "Meals for the Business Woman."

In the afternoons, the discriminating housewife is shown how to cook the fascinating cakes she has tasted abroad, and in the evening the business woman sees how easy it is to cook appetising and attractive meals in the minimum amount of time.

These demonstrations proved extremely popular in Southampton, and the audience, which averaged approximately 100 people per day, were very appreciative, many questions being asked of the Demonstrator, Miss R. Gilmour of the Radiation Research Kitchen.

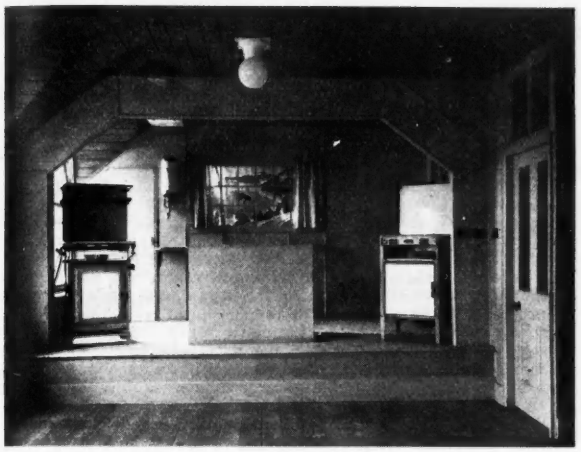
The Southampton Gas Company found the outcome of this effort was a definite increase of orders for new cookers, &c., during the week's demonstrations.

All-gas Swimming Pool

Gas-Heated—Now to be Gas-Floodlighted.

Another success has been achieved by the Andover Lighting and Power Company, who recently installed a B2 Vesta Boiler for heating the water in the Andover swimming pool. The capacity of the pool is 83,000 gallons and the temperature is being maintained at 68° F. Now the pool is to be floodlighted by gas. This excellent order has been obtained by the Company from the Andover Corporation.

A Small Undertaking's Achievement.



A demonstration theatre might seem a matter for contemplation only for the smaller gas undertaking, but this photograph of what has been achieved at Waterford by Mr. F. J. Edmonds will be encouraging not only to Mr. Edmonds' *confreres* so recently in conference at Dublin but to many in this country especially since the initial and maintenance costs of the Waterford theatre are very low. Before embarking on this scheme, Mr. Edmonds tells us, it was considered advisable to feel the response to such demonstrations by converting a small hall on the Works into a demonstration hall and carrying out a series of demonstrations in it. The hall, with accommodation for eighty persons, was filled to capacity during each demonstration and lecture.

£40,000 Prize Competition Papers.

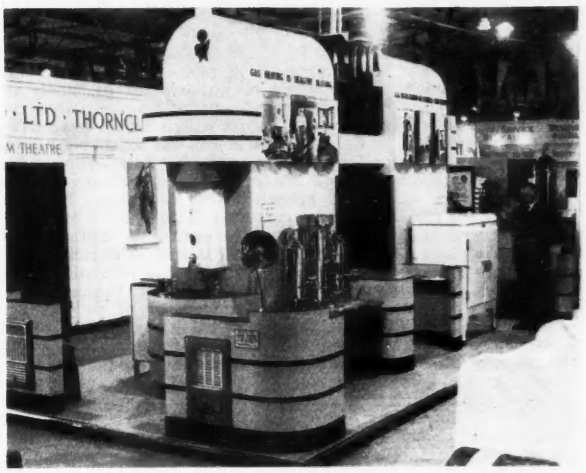
The most successful Papers entered in the recent £40,000 Prize Competition of the James F. Lincoln Arc Welding Foundation have now been published in book form by the Foundation.

Section 8 is devoted entirely to Papers on the use of welding for boilers, pipes, penstocks, &c., all being original studies showing new economies and advantages to be obtained from arc welding. Each paper is complete with all relevant photographs and drawings. At the end of every Paper is given the cost saving which results from the use of welding on that particular product. The book contains upwards of 1,400 pages and is published at the nominal price of 9s. 6d., post free, by the Lincoln Electric Co., Ltd., Welwyn Garden City, Herts.

B.G.F. Display at Royal Sanitary Institute Exhibition.

A most interesting and attractive exhibit was arranged by the British Gas Federation in conjunction with the United Kingdom Gas Corporation, Ltd., at the recent Royal Sanitary Institute Exhibition, which was held at Scarborough.

A comprehensive display of cooking, heating, water heating, and refrigeration appliances was arranged, and a central heating installation proved of considerable interest to visitors. A small tea bar



was incorporated in the stand, and refreshments were provided by means of "Ascot" boiling water heaters. Enquiries were received from many parts of the country and included a number from medical officers of health, councillors, and surveyors.

The stand construction and general arrangements were carried out by the Publicity Department of the United Kingdom Gas Corporation, and the success of the exhibit was proved by the award, made by the Royal Sanitary Institute, of a silver medal.

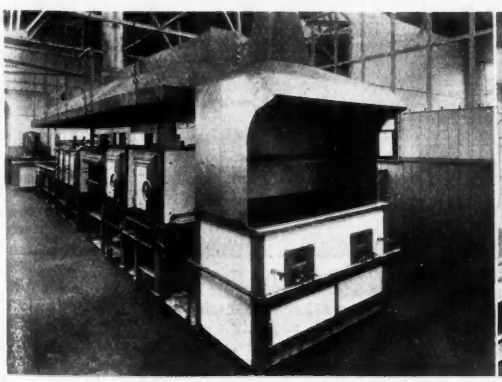
University of Leeds.

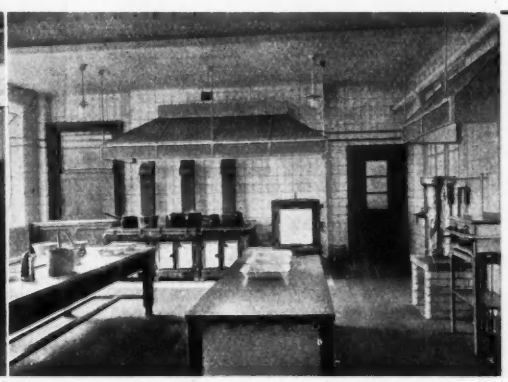
New Post-Graduate Diploma.

For many years past the University of Leeds has provided courses for post-graduate students leading to special Diplomas both in Gas Engineering and in Fuel and Metallurgy. It has now added to these a one-year course leading to a post-graduate Diploma in Fuel and Refractory Materials, in order to meet the growing demand for men with special training in Refractory Materials.

Commencing in October next, the new course will be given in the Department of Coal Gas and Fuel Industries, and will be additional to the normal instruction in the subject received by all students reading for Degrees in Gas Engineering and in Fuel and Metallurgy. An approved Degree in Science or Technology is required as a preliminary qualification; and the subsequent specialized training in Fuel and Refractory Materials is intended as preparation for entry into either the "manufacturer" or "user" sides of the refractories or allied industries.

Particulars of these courses may be obtained from the Registrar of the University.





Here are two examples of up-to-date kitchens fully equipped with Radiation large-scale gas apparatus. On the left is a view of the Works Canteen of Short & Harland, the Belfast Shipbuilders, while on the right can be seen some of the appliances installed in the kitchen of the Whalley Range High School for girls opened by H.R.H. the Duchess of Kent.

The London Gas Undertakings (Regulations) Bill

The Unopposed Bills Committee of the House of Commons, on Thursday, July 27, ordered to be reported for third reading the Bill promoted by the London gas companies enabling them to make regulations, with the approval of the Board of Trade, governing the materials and construction and fitting, &c., of gas installations and apparatus, and the provision of proper ventilation, fire precautions, &c. Colonel Clifton Brown (Deputy Chairman of Ways and Means) presided over the Committee.

(The provisions of the Bill were set out in the "JOURNAL" for Jan. 18, 1939, p. 169.)

The position was explained by Mr. C. E. C. Browne (of Messrs. Dyson Bell & Co., Parliamentary Agents), who said it was promoted by the five gas companies whose limits of supply included parts of the Administrative County of London (which included the City of London), and its provisions would have effect only in the County of London. Its object was to enable a code of regulations to be set up dealing with the installation of gas and gas-fired appliances and the operations in connexion with them, to secure safety and efficiency with economy. The procedure for the making of the regulations was a little complicated; but the companies proposed that there should be regulations to effect the control which they considered should be exercised over the various operations concerned. The proposed regulations were to be submitted to the Board of Trade, which would refer them to an expert Committee (for the establishment of which provision was made in the Bill). The Committee would then report on the proposals and submit recommendations to the Board of Trade. The Board of Trade would then make the regulations, having regard to the recommendations of the Committee, and to the views of the London County Council, the latter being the building authority in the County of London. The regulations, as approved by the Board of Trade, would be binding upon the companies, their employees, their contractors, and any other person carrying out any of the works or operations covered by the regulations.

The great bulk of the work of that kind in London, he said, was done either by the companies and their staffs directly or by their contractors, only a small percentage being done by outside plumbers and gasfitters. A consumer, of course, could employ an outside plumber or gasfitter if he wished. At present, where premises were equipped internally for gas supply, the company whose duty it would be to supply the gas had no real powers of inspection or control, but had simply to turn on the gas from the main. The gas companies, having spent a great deal of money and a great deal of time on research into everything concerned with gas and gas fittings, claimed to be thoroughly expert in those matters. It was recognized that they ought to establish the code of regulations, which would be enforceable by them against the people who carried out the small percentage of gasfitting which was not done by the companies themselves. In other words, for the first time there would be a complete code of regulations which would as far as possible ensure safety to the consumers.

Asked by members of the Committee whether that meant that the companies would put in all fittings, Mr. Browne said that it did not. The companies would be able to say how the fittings should be installed, by whomsoever they were installed. Ordinary gas consumers were not bound to purchase fittings from the gas companies; in the case of prepayment supplies, of course, the fittings remained the property of the gas companies and were on hire to the consumers.

One of the principal reasons which had induced the companies to consider the promotion of the Bill arose out of the London Building Acts, of which there were two—1930 and 1935. Under the 1935 Act the County Council had made certain building by-laws, which had come into force on Jan. 1 last year. Those by-laws were enforceable by the district surveyors. For the purposes of the London Building Acts the County was divided into districts, each having a district surveyor, and some of the companies' limits of supply included the districts of several district surveyors. By-laws, in their application to matters such as gas fittings and gas appliances, were not entirely easy to construe, and, of course, each district surveyor might have a different view of the intention in respect of a by-law. The by-laws were in such a form that, if an extreme view were taken of their effect, the companies might have to give notice to the district surveyors in regard to literally many thousands of day-to-day operations which they carried out, and pay a minimum fee of 10s. 6d. That would amount to a very large sum in the course of a year in the very large companies, and, of course, it would have to be passed on to the consumers as part of the expense of installing their apparatus. But in most cases, the companies having paid the fee, there would be nothing for the surveyor to do; there would be merely the formality of giving notice and paying the fee. If there were anything to do, it would concern matters in regard to which he believed the district surveyors would be the first to say they did not claim expert knowledge. That did not seem to be for the benefit of the consumers of gas; and it was part of the arrangement with the London County Council—which had very closely scrutinized the Bill—that when the regulations came into force the jurisdiction of the district surveyors with regard to such matters, which under the existing by-laws would otherwise come within their jurisdiction, should cease.

There was a reservation that in the extremely unlikely event of the installation of a gas supply in a house affecting the stability of the walls of the building, the district surveyor would be entitled to serve upon the party carrying out the work a Notice of Irregularity. That was the only extent to which the district surveyors would in future be concerned with the works and operations for which the regulations were to be made.

A further proviso was to the effect that if the London County Council exercised their existing power to make new by-laws, the gas companies were to propose at once a regulation superseding the new by-laws so far as they affected works or operations of gas fitting and gas supply.

The Bill contained a number of other provisions of a more or less detailed character, preserving the rights of the London County Council in certain respects, and dealing with the enforcement of the regulations. Some drafting amendments had been suggested by Speaker's Counsel, relating specially to the provisions of enforcement. Certain of the regulations were to be known as "structural" regulations, and would take the place of the by-laws of the London County Council concerning the effect of gas installations on the stability of buildings, ventilation, and matters of that sort. Provision was made for the London County Council to prosecute for infringement of the structural regulations. There was not a direct power to the London County Council to institute proceedings for contravention of the structural regulations against anybody other than the gas companies; it was the duty of the companies themselves to take proceedings against any other persons. But if the companies failed to take proceedings, after having been asked by the London County Council to do so, the Council could institute proceedings against those other persons. In a clause dealing with explosions or fires arising out of gas supply, it was provided that notice should be given to the London County Council and the City Corporation, which bodies had powers to inspect the premises and fittings; if it appeared to them that the work was not done in accordance with regulations, the party who had carried it out was to be liable to prosecution and penalty.

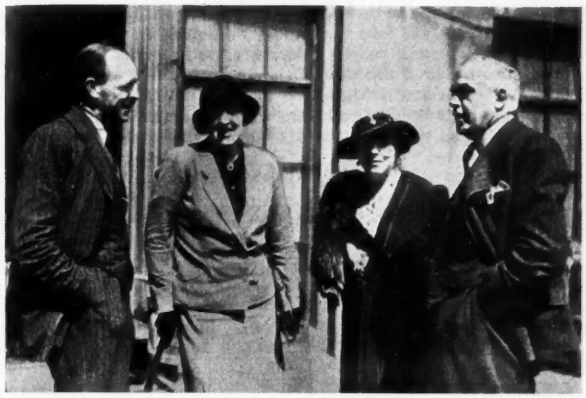
It was the principle which Mr. Browne asked the Committee to approve, subject to the drafting being perfected in consultation with Speaker's Counsel.

The preamble of the Bill was proved by Mr. R. W. Foot (General Manager, Gas Light and Coke Company), who said his company was one of the five companies promoting the Bill, and that he had been in close consultation with the representatives of the other four companies.

The Bill was ordered to be reported for third reading, subject to the drafting amendments referred to.

Members of the Home Service Advisors' Circle of the Severn Valley Gas Corporation, Ltd., were keenly interested in the production of gas cookers when they were recently the guests at the Deepfields Works, near Bilston, of Cannon Iron Foundries, Ltd. Our photograph of the visitors, whose smiles testify to the enjoyable nature of the visit, was taken at the conclusion of the tour of the Works.

The Irish Association of Gas Managers Gather Again in Dublin



The Acting President of the Association and his wife (Mr. and Mrs. George Anderson, of Kilkenny) chat with the President of the Institution (Mr. George Dixon) and Mrs. Dixon.

The Annual Meeting of the Irish Association of Gas Managers was held in Dublin on July 25 and 26.

Ever ready—as they must be—to take advantage of suggestions for improvement, the Irish Association of Gas Managers decided a year ago that the 1939 Annual General Meeting should be held, as an experiment, in July, rather than in August, as had been the custom for many years past. Tuesday, July 25, was the date eventually decided upon, and it was then that the members met for the transaction of business in the ballroom of the Gresham Hotel, Upper O'Connell Street, Dublin, with the Acting President, Captain GEORGE ANDERSON, of Kilkenny, in the chair. Unhappily, the President, Mr. F. G. McElwee, of Coleraine, had died during his year of office, and the Association were fortunate in having a Vice-President who was both able and willing, at short notice, to step into the breach.

With regard to the "experiment," it appeared that this had failed in its object, inasmuch as the new attendances so ardently desired were not secured, while, in addition, some of those one had been accustomed to welcome at the August meetings were, from one cause or another, absent on this occasion. The result appeared (though this may have been a mistaken impression) to be a somewhat smaller gathering than usual. If that was so, it is to be regretted, for the happy atmosphere of the meeting, and the subsequent generous hospitality of the Acting President, made 1939 memorable in the annals of the Association.

The cross-Channel visitors included Mr. George Dixon, of Nottingham (President of The Institution of Gas Engineers), and Mrs. Dixon, Mr. E. J. Fottrell (Joint Manager of the National Gas Council of Great Britain and Ireland), and Mr. P. J. Lucas (Secretary of the British Commercial Gas Association). Mrs. Eileen Murphy (one of the Association's two Honorary Members), who had been on a visit to America, wired: "Best wishes for successful meeting. Regret absence. Arrived late Southampton."

The PRESIDENT said that, before they started their business proceedings, he felt it his duty to refer to the sad and untimely death of the gentleman who should have presided over the meeting that day—Mr. F. G. McElwee, of Coleraine. The Secretary had already conveyed the sympathy of the Association to Mrs. McElwee, and he would now ask the members present, as a mark of respect, to rise in their places.

The members stood in silence.

An Official Welcome.

The PRESIDENT remarked that it was next his pleasure to ask her Worship the Lord Mayor of Dublin to open the proceedings. For a good many years past, whenever the Association had held their meetings in Dublin, the ex-Lord Mayor, Alderman A. Byrne, had come along to welcome them, and his successor had in the same way kindly consented to do so. He was sure they would all join with him in wishing the new Lord Mayor as long a term of office as had been enjoyed by her predecessor.

The LORD MAYOR (Mrs. Tom Clarke) said it was a great pleasure to be with them. She had had no idea a few months ago that she would be put in her proud position, but she was trying to further the interests of the city in every way she could. She offered to the Association the welcome of herself and the City of Dublin.

Working for the Common Good.

Mr. GEORGE DIXON (after having been welcomed to Ireland by the President) said it was one of the perquisites of the President of The Institution of Gas Engineers that he had the privilege of paying a visit to this beautiful country of theirs, and it was one of the things to which he had looked forward for a very long time. His duty was simply to say, on behalf of the Institution in London, that they wished their colleagues in Ireland every success in their meeting. All were working for the common good—that was, the best service they could give to their consumers. The Gas Industry was becoming more and more scientific, and there was a tremendous need for research. The Institution of Gas Engineers were now organizing a new research body, in order to ensure the further progress of their Industry, which, even though it was 120 years old, was really only beginning to give the service which they knew it was able to give. He felt he must say a word about the late President. Mr. McElwee had not long been with them at their Council meetings in London, but his genial nature had endeared him to all. He had been doing good work, and they on the other side were as grieved as the Irish Association were at his death.

The Presidential Address.

After the delivery of the Presidential Address, which will be found on another page of this week's "JOURNAL,"

Mr. P. J. MACEVOY (Midleton, Co. Cork) said he wished, on behalf of the Association, to propose a hearty vote of thanks to the President for his Address. They would agree that Captain Anderson had lived up to his father's traditions. As a boy, he (the speaker) had had the great privilege of being in the employment of Messrs. Anderson. He must say, in all sincerity, that the Anderson family had certainly contributed more than their share to the Gas Industry of that country. Their engineering ability was fairly well known to him, but there was one thing in particular which he would like to stress —their great humanity. Their kindness to the employees, their keen sense of fair-play, would certainly take a more eloquent tongue than his to make fully clear. It was employers like this who appealed to those connected with the Gas Industry. Men did not mind how hard they were driven by a Board of Directors or by a Managing Director, if they felt that their efforts were duly appreciated, and it was by their realization and acknowledgment of efforts made on their behalf that the Anderson family had achieved so much good. He was merely echoing the sentiments of every member of the Association in saying how deeply they appreciated the way in

which Captain Anderson had stepped into the breach and helped them out of a difficulty by taking the Chair at short notice during a period of great stress.

It was with very much pleasure that he presented the Acting President with the Association's badge of office.

The PRESIDENT declared himself overwhelmed by the kind things Mr. MacEvoy had said, and if he had any regret it was that his father could not be present with them that day as he was thirty years ago. However, he had them all in mind, as a wire had just come from him wishing them success. Anything his family had been able to accomplish had been entirely due to the excellent and unselfish service they had had from their staffs. He had at his right hand on the platform the Association's Hon. Secretary, Mr. L. W. Dalby, who had been with the firm for over thirty years; and he saw before him Mr. Young, who had almost completed forty years at one works or another. It was easy, when they had such hard working and loyal managers, for the firm to carry out their job. They did not have to do any driving.

Committee's Report and Accounts.

The HON. SECRETARY (Mr. L. W. Dalby, Kilkenny) then proceeded to read the following report of the Committee:—

The Annual Meeting held in Dublin last August was well attended, and the interesting paper presented by Dr. Barash on "Solid Smokeless Fuel" was thoroughly appreciated by our members.

We deeply regret to record the untimely passing of our President, Mr. F. G. McElwee (Coleraine), which took place on May 23 last. The sympathy of the Association was formally conveyed to Mrs. McElwee by your Secretary, and a floral tribute sent. Messrs. J. D. Smith, J. K. Harrison, D. McIntyre, A. S. Brook, and F. S. Clegg attended the funeral as representing the Association.

During the year there also passed away Mr. F. A. Sadlier, formerly Secretary to the Enniskillen Gas Company who had been a member of our Association for over ten years.

Resignations were received from Messrs. J. R. W. Alexander, London; R. P. Chester, Manchester; and F. Jackson, Birmingham.

At our last Annual Meeting a fund to assist the widow of the late Mr. F. J. Lusted was opened, and we received from members £57 14s. The Association voted twenty guineas to this fund, and the total of £78 14s. has been paid over to Mrs. Lusted, who returned her thanks for our assistance.

Your Committee would again impress upon members the necessity of assisting your Secretary and Treasurer by sending in arrears, subscriptions, and other communications when requested, at the earliest possible date. Your co-operation would greatly help the work which is undertaken on your behalf.

The balance to the credit of our General Fund now stands at £92 12s. 10d.

Mr. GEORGE AIRTH (Dundalk), as Hon. Auditor, presented the accounts, explaining that there was a balance in the bank of £92 12s. 10d. Subscriptions in arrear were £68, which was not to their credit. They started the year with a balance of £124 11s. Subscriptions amounted to £83 1s., which was a little more than the year before. Expenses ran very nearly the same as in the preceding year, and they were only a few pounds down, after making a contribution of £21 to the Lusted Fund.

The report and accounts were adopted without discussion, on the proposition of Mr. H. W. SAVILLE (Wexford), seconded by Mr. J. M'NICHOLL (Cork).

Mr. J. W. YOUNG (Monaghan) then read a paper entitled "The Control of Gas-Works Operations by Recording Appliances and Automatic Control Apparatus." This, together with a report of the lengthy discussion to which it gave rise, is dealt with elsewhere in this issue.

New Officers and Members.

Mr. W. COLE (Dublin) and Mr. E. W. KING (Elland), having been appointed Scrutineers to go through the ballot papers, reported the elections to be as follows:—

President.—G. Anderson (Kilkenny).

Vice-Presidents.—H. L. Adams (Tipperary) and A. Robin (Belfast).

Hon. Secretary and Treasurer.—L. W. Dalby (Kilkenny).

Auditor.—G. Airth (Dundalk).

Members of Committee.—J. L. Hyslop (Belfast), W. P. Lonergan (Wicklow), R. Healy (Cork) and W. Reid (Athlone).

District Representative to Council of Institution of Gas Engineers.—H. W. Saville (Wexford).

Ordinary Members.—D. Scott (Kilkenny) and M. A. Waddell (Carrickfergus).

Extraordinary Member.—Norman Bruce, of Messrs. Shaw (Glasgow), Ltd., Glasgow.

The PRESIDENT pointed out that on the present occasion he was undertaking the duties of Acting President, and he thought it would be more than he should, or could, do to occupy the Chair for a second year. Therefore, he formally tendered his resignation. In these circumstances, of which the Secretary had had prior knowledge, two names as Vice-Presidents had been included in the balloting list. The first-named gentleman he hoped would forthwith follow him in the Chair.

Date of Meeting.

The HON. SECRETARY once again raised the question of the date of the Association's Annual Meeting. He pointed out that at the meeting twelve months ago a resolution was carried to the effect that they should hold their meeting this year in the month of July, as an experiment, the exact date to be decided upon by the Committee. However, members had got so accustomed to the meetings being held in the second week of August that quite a number had been disappointed at last year's decision to change the date. On the other hand, some people found difficulty in attending in August, and so it was felt that a chance should be given them to appear in July. Well, they had been given this chance, and again they had failed to turn up. Therefore he thought that—unless the meeting desired to expressed another opinion—they should revert next year to August, because he believed that was the best time for the meeting.

Mr. SAVILLE formally moved that next year they revert to August for the meeting.

Mr. MACEVOY, seconding, remarked that the date had been changed in order that the officials of the Dublin Gas Undertaking should be able to be present, but they had not come along. In fact, there was a falling-off in attendance which he thought was really due to the change of date.

Mr. EDMONDS said it was a great pity that the Dublin people were not present at the Annual Meetings of the Association to give them a lead.

Mr. M'NICHOLL remarked that the experiment of holding the meeting in July had not been successful, but he thought they should leave it to the newly appointed Committee to make a decision.

This was agreed to.

Mr. SAVILLE proposed a vote of thanks to the President and officers for the good work they had done on behalf of the Association. He said they were all deeply grateful to the President for the able manner in which he had stepped into the breach at short notice.

Mr. A. KIRKHAM (Enniscorthy) seconded the vote, which was cordially passed.

The PRESIDENT, in acknowledgment, remarked that all possible commendations were merited by Mr. Dalby, who year after year put in a tremendous amount of work for the Association.

At the close of the proceedings, members, visitors, and lady friends took light refreshments in the Hotel, on the invitation of the President.

N.G.C. Irish District Executive Board Meeting.

The eighteenth annual meeting of the N.G.C. Executive Board for Ireland was held at the Gresham Hotel, Dublin, in the afternoon.

Apologies for their unavoidable absence were reported from Mr. J. D. Smith (Chairman) and Mr. W. J. Grey (one of the Vice-Chairmen), and the chair was taken by the other Vice-Chairman, Mr. J. Rowan (Cobh). The Chairman and the two Vice-Chairmen were unanimously reappointed to these offices for the ensuing year.

The following were unanimously appointed to the Management Committee: Messrs. G. Airth, G. Anderson, J. M'Nicholl, Scott, W. M. Pettigrew, A. Robin, J. A. Rooney, P. J. Rooney, J. D. Smith, H. W. Saville, G. Walmsley, L. W. Dalby, W. J. Grey.

The following members were reappointed to the Central Executive Board: Messrs. G. Anderson, W. J. Grey, J. M'Nicholl, J. D. Smith.

Mr. G. Anderson was reappointed to the Emergency Executive Committee of the Central Executive Board.

Mr. F. J. EDMONDS intimated his desire to be relieved of his duties as one of the Hon. Secretaries, and the thanks of the Board were tendered to him for his services to the Board. Tributes were paid to the energy and efficiency which he had displayed during his tenure of office. Mr. Doyle (Cork Gas Co.) was appointed to succeed Mr. Edmonds, and Mr. A. S. Brook was unanimously reappointed as the second Hon. Secretary.

Mr. E. J. FOTTRELL (Joint Manager of the National Gas Council) referred to the services which the headquarters of the Council were in a position to render to members and urged that more frequent use should be made of the available facilities.

Publicity in Ireland

Mr. P. J. Lucas (Secretary of the B.C.G.A.) gave a description of the B.C.G.A. newspaper advertising campaign in Ireland, and then reviewed the work of the Association over the past year and the activities under consideration for the future. Looking back over the past twelve months, Mr. Lucas suggested that the Industry's interest in commercial or marketing problems had taken a big step forward, and in connexion with this the Association had endeavoured to give the utmost assistance by the planning of newspaper advertising and the preparation of suitable propaganda material in the form of literature, films, posters, special press advertisements, &c.

Speaking of the future, Mr. Lucas remarked that the Association considered that the central bodies were bound to play a bigger part in the planning of the most effective organization to meet and overcome competition. Advertising and propaganda were not enough ; everything " behind the scenes " must be highly organized and planned so that undertakings would be in a position to offer gas service on the most attractive terms. It was intended that research into all the commercial problems with which the Industry was faced should be carried out, so that members might be placed in possession of information which they could adapt to local circumstances.

Dinner with the President

Members and their lady friends assembled once again in the ballroom of the Gresham Hotel in the evening, as the guests of the President at dinner. Everything combined to make the function a thoroughly enjoyable one—music, song, and speech being all attuned to so hospitable an occasion. It was a fitting conclusion to a very pleasant day, and will afford one more happy memory in connexion with Irish Gas Association Meetings.

The PRESIDENT (who was accompanied by Mrs. George Anderson) having submitted the toast of " Ireland—North, South, East and West ; Peace, Health, and Prosperity,"

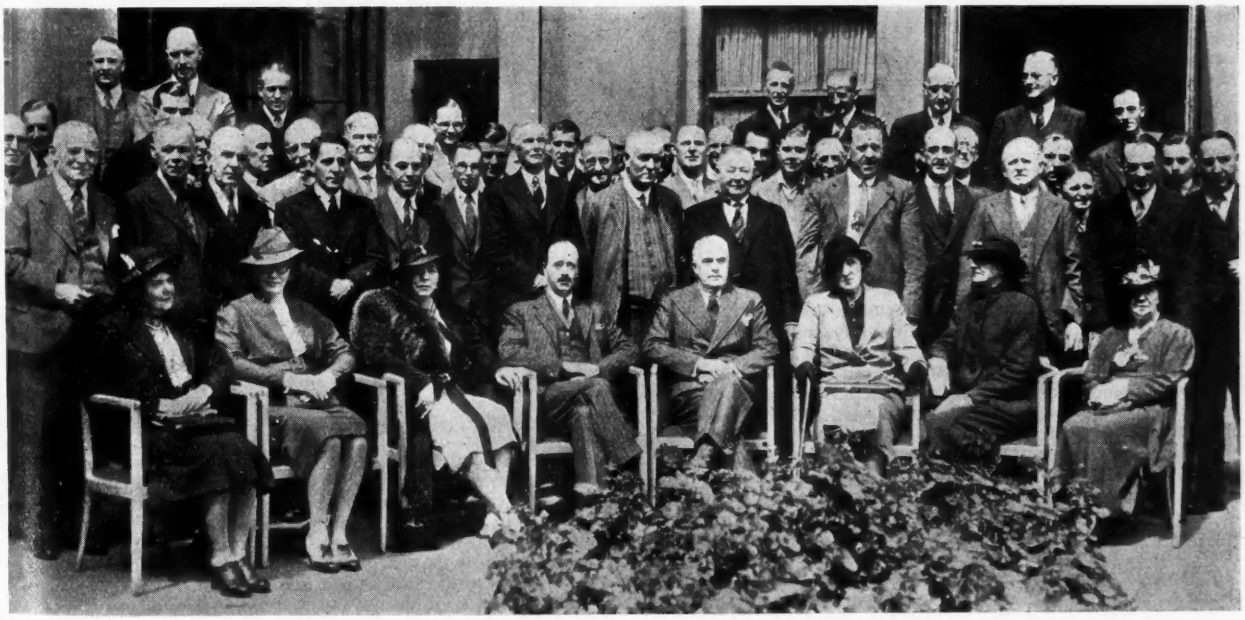
Mr. F. J. EDMONDS proposed " The Lord Mayor, the Corporation, and the City of Dublin." He congratulated Mrs. Clarke on the honour that had been bestowed upon her, and said they hoped her term of office would be one of peace and prosperity. They in the Gas Industry welcomed the opportunity of addressing a lady Lord Mayor, for they felt that, in her knowledge of the responsibilities of housekeeping, she would realize the potentialities of gas, and its advantages. Prosperity for the City of Dublin meant prosperity for the whole of Ireland.

The LORD MAYOR (Mrs. Tom Clarke) said the fact that a lady now occupied the Mayoral Chair had been said by some to be the beginning of a new era in that country. If so, she sincerely hoped that this new era would be one of peace and prosperity. The one thing that the country wanted above all others was peace —the peace of prosperity. It was only in peace times that a country could build-up prosperity. Members of that Association had already done wonderful work towards prosperity through their development of the Gas Industry. They were good employers, and, so far as she could see, the Gas Industry, instead of being stationary, was going ahead as very few other industries in that country were. The Corporation were building houses, not for the rich or well-to-do, but for the poor, and in that work they found the gas undertaking indispensable. They had to build houses in which the aim should be to make work so easy for the housewife that life would be happier for her. Gas was able to provide good, easy, and cheap facilities for the cooking of food. It had found its way into the very poorest homes, and even in the slum dwelling it offered a chance to the housewife to prepare her meals in an enticing form.

Three Generations

Mr. J. M'NICHOLL called upon all present to drink to the health of Mr. George Anderson, as President of the Association and as their host that evening. He had taken on the duties of the office in sad circumstances, and had carried them out in a manner worthy of the best traditions of that or any other Association. He bore a name which had been honoured in the Industry for several generations. He (the speaker) had met many men who had known the Anderson Brothers—Mr. Bruce and Mr. George Anderson—and they all spoke of happy relations, which it was hoped would continue under the present Chief, their President. He had come to live in that country, and they trusted he would never regret having done so. The toast was " Prosperity to their President, and to the Companies which were under his charge."

The PRESIDENT (who was greeted with musical honours)



In the centre of this group of delegates to the Irish Association meeting are Mr. George Anderson (President, Irish Association) and Mr. George Dixon (President, The Institution of Gas Engineers).

remarked that his family had been associated with the Gas Industry for three generations—his grandfather having been the first. In fact, they had been associated with gas in that country for a matter of close upon a hundred years; and he could say, without hesitation, that their associations had been definitely happy. His own associations, during the ten years that he had spent in the country, had also been happy. He attributed this entirely to the fact that the firm had with them loyal Managers and staffs, including some men who had been with them for from twenty up to even fifty years. He was glad to say that hitherto the firm had regarded those who served them—and he thought he might justifiably claim that this feeling was reciprocated—as members of a happy family. There was no reason, so far as he could see, why this state of affairs should not continue.

The toast of "Kindred Associations" was in the hands of Mr. G. WALMSLEY, who expressed the deep gratitude of the Association to Mr. Dixon for having come over to Ireland during his year of office as President of the Institution. The help annually of Mr. Fottrell and Mr. Lucas was, of course, indispensable. He would like to take the opportunity of acknowledging his own indebtedness to the staffs of the organizations with which the Association were affiliated. They were ever ready to help.

A Weak Link.

Mr. GEORGE DIXON, in reply, mentioned that he had had a wonderful time during his visit to Ireland as representing The Institution of Gas Engineers, and so had his wife. In the Industry all the organizations were one body—one team—and there was no question of individual concerns. They thought of the Industry as a whole, and their success always had been, and always would be, derived from the fact that all the associations worked and pulled together. That was their strength in England, and he believed there was sufficient evidence that it was their strength in Ireland, too. There was, however, a weak link in the strength in the latter country which he thought was regrettable. He was sorry that at the meeting of the Association there was no representative of the great Gas Company of the city. While it might be quite true to say that there was not a great deal to be gained by the Company through attending, there was, on the other hand, a great deal to be given by them. He was unable to see how the "team" could be regarded as complete under present conditions. It was unreasonable to expect to run the Industry to the best possible advantage unless it was realized to the full that each was dependent upon the other.

The remaining toasts were "The Ladies," proposed by Mr. W. COLE, and replied to by Mr. SAM HALL; and "The Press," which was submitted by Mr. H. W. SAVILLE, and acknowledged by Mr. ALFRED HARRISON (Director, Walter King, Ltd.).

The Excursion.

Though they had visited it as recently as 1936, so pleasant were the memories treasured by the members of the amenities of Kilmacurra Park that it was decided to return there for the outing this year, and once again pleasurable anticipations were realized to the full. The weather was kind, which enabled the coach ride of some 36 miles from Dublin to be enjoyed to the full; the luncheon was ample in proportions and the service fully adequate to the occasion; and from morn to eve there was no need for anyone to experience a dull moment.

In the afternoon there was the customary golf competition, or, for those who preferred it, a coach trip to the Vale of Avoca and back to tea. Still others were free to roam the 600 acres of gardens and grounds which are available for the use of visitors to Kilmacurra Park. Nature has been exceeding kind to County Wicklow, and in Kilmacurra Park has provided an ideal setting for care-free relaxation from the stress of work-a-day life.

IRISH ASSOCIATION OF GAS MANAGERS

Presidential Address

BY

GEORGE ANDERSON, Kilkenny

The President.

Thirty-three years ago, in 1906, your Association honoured my father by electing him your President. To-day it is my privilege to take the chair, and when, last year, you honoured me by electing me Vice-President, it occurred to me that an interesting form of Address, when it came to my turn to prepare one, would be a brief survey of the Industry which we all serve, during the last generation, with particular reference to this country, of course.

Having started on my task I became overwhelmed with my temerity, as it very soon struck me forcibly that probably no period in the whole life of the Gas Industry has been so critical as the past thirty years, which have seen the steady rise in prices; the intense growth of competition; industrial unrest, from which, I am glad to say, the Gas Industry has remained remarkably free, a tribute both to employer and employee; the War, with the thousand and one difficulties and troubles which it brought with it and left in its wake; the number and magnitude of the changes and improvements which have taken place in plant and appliances; and last but not least, the change from the engineering to the commercial tone of the Industry. Despite this and despite the fact that it is supposed to be impossible to teach an old dog new tricks the Gas Industry, which was certainly an "old dog" in 1906, has adapted itself to these manifold changes, and is still the purveyor of the cheapest, most reliable, and most convenient fuel.

Coal Prices.

On turning up old records, I was positively shocked to see the price we used to pay for coal compared with what we have to pay now. In 1906, merchants, who now complain at having to supply us with coal at 24s. per ton f.o.b., were prepared to sell at 12s. 6d. per ton f.o.b., an increase of nearly 100%. By early in 1914 the same coal had risen to 14s. 7d., by 1916 to 17s. 6d., and by the end of the War, to 30s. By 1920, owing largely to Government control, the price had soared to 55s., of which 20s. 8d. was accounted for by various Acts directing price increases. After 1920 prices fell again, to settle at about 19s. to 20s. per ton, except for the period of the 1926 coal strike, when fantastic prices had to be paid for any coal that could be got, until 1936, when closely controlled selling schemes came into operation in England, which have resulted in increasing prices to their present levels. In the South, of course, we had our own local troubles, when for a time between 1932 and 1936, we had to pay 5s. per ton duty on British coal, and during one period, were virtually prohibited from buying duty free Continental coal. When it is considered that coal is the very life blood of our Industry, it is worthy of note that gas prices have not increased in anything like the same proportion as our raw material.

In the main, I should not say that we, in Ireland, have seen many changes in carbonization during this period, though, of course, considerable changes have taken place in the Industry

generally. Vertical retorts, although existent before 1906, may be said, for all practical purposes, to have become established since then. Steaming the retort, bringing with it the dilution of straight gas with blue water gas, has become general. Considerable changes have, of course, also taken place in regard to retort-house machinery. Water gas plants have been increasingly used, and complete gasification plants have been introduced, and recently more widely used on the smaller works. The economical use of either of these plants must depend on relative coal/coke prices.

So far as coke is concerned, we are fortunate in this country that the demand has been, and still appears to be, increasing. While, thirty years ago, the baker and the farmer probably provided the main outlet for coke, of latter years the domestic use of the fuel has become increasingly popular. As yet, though, there is still ample ground to be opened in this respect, and I think that the smaller works in this country should be paying more attention to the proper grading of coke for domestic use and the encouragement of its use in the open as well as the closed fire.

It would be impossible, in the time, to deal in any detail with the vast improvements in gas-works plant, from retort house to holder. The air cooled condenser gave way to water cooled condensers of various types. Reversible condensers which helped to reduce the naphthalene left in gas were adopted. Many advances have been made in the type of washers used, but, nevertheless, the Livesey and Clapham washers are still widely and satisfactorily used. Purification has seen a considerable change from lime to oxide. Thirty years ago lime purification was dying out, and has since been completely replaced by oxide. The design of holders has changed considerably. The column-guided holders have given way to the spiral guided, and we now see the advent of the waterless holder. Holder tanks have tended to rise above ground, and steel tanks have replaced concrete.

Improvements in Meters

Meters have, like everything else, been steadily improved. By 1906 the dry meter had established its advantages over the wet meter, though the latter was still in use. The slot meter had also arrived, but its use had certainly not reached anything like the proportions which it has to-day. In 1906 the percentage of prepayment meters to the total number of consumers was twenty-seven. To-day the percentage is sixty-eight. Optional two-coin meters were not known, any change from one coin to another having to be made by a fitter or collector. The capacity of meters has steadily increased. In 1906 we had the "lights" meters passing 6 cu. ft. per hour per "light." In 1921, the Meters Committee of The Institution of Gas Engineers adopted a new series of meters with increased capacity and termed them "standard meters." In about 1925 the high capacity meter was introduced, resulting, in 1935, in the D.1, D.2, and D.3 standardized models of super high capacity series.

If we turn to appliances we see, perhaps, the greatest changes of all. Although, of course, the incandescent mantle had been introduced in the 'nineties, in 1906 the flat flame burner was still widely used. In fact, out of 702,980 public lamps then in use in Great Britain and Ireland, about half were fitted with incandescent burners. The mantle of 1906 was of the upright type, although about that year, or shortly after, the inverted burner was introduced. During the period, considerable improvements have been made in the manufacture of mantles, artificial silk having replaced the earlier cotton or yarn. Sweeping advances have naturally followed in the manufacture of burners, by-passes, controllers, and igniters. In 1927 the British Standards Institution Street Lighting Specification placed gas and electricity on a footing which enables both illuminants to compete on the same basis. It is to be regretted that all public lighting tenders are not asked for in accordance with these specifications.

Who would recognize the unpacked cooker or gas fire of 1906 as even of the same family as the smart, modern cabinet cooker or elegant fire? Who, in 1906, would have thought of the popularity, in fact, even necessity, of the 1939 gas-operated refrigerator? It was about at the beginning of the period under review that scientific development of appliances started. It is interesting to note, too, that in 1906, the leading medical organ, *The Lancet*, initiated tests of a number of gas fires in regard to efficiency and hygienic performance. Further tests were also carried out by Brearley, and later by The Institution of Gas Engineers. In 1909, the radiation from the open gas fire was found to amount to about 32% of the heat generated, as compared with 25% from an open coal fire. Steady improvements in design of the gas fire have now improved the heat radiated, to 50% or over. In 1906, cookers were, for the main part, unpacked, they were fitted with top flue only, boiling rings were haphazard, and of low efficiency, grillers were of cast iron, slow heating, and short life. Automatic control was unthought of. A moment's consideration of the modern cooker, possibly of the cabinet type, or, at least, enamelled, with its convenient thermostatic control, will show the disabilities under which the cook of 1906 worked, compared with her daughter of 1939.

Aesthetically, the design of all appliances has advanced with the times, with the result that fires, cookers, radiators, and so forth, can now be had in artistic colours and line—a great and pleasant change from the black horrors of thirty years ago.

Thermal Basis of Charge

Between 1871 and 1920 there was no legislation affecting the Industry as a whole. In 1920 the Gas Regulation Act was passed in Britain, and since then, various other Acts of less importance have been passed in England, and, in Eire, the Gas Regulation Act of 1928. Perhaps the most important part of the 1920 Act was the authorization of the charge for gas on a thermal basis instead of by the cubic foot. This required the declaration of calorific value by statutory undertakings. It was obviously a wise change that we should sell heat rather than volume. From a commercial point of view, however, it is to be regretted that, instead of the therm of 100,000 B.Th.U., a gas unit equivalent to the Electrical B.O.T. unit of 3,412 B.Th.U., was not devised.

The desire for some comparative medium has led some gas companies to sell on the basis of a gas unit, for convenience sake selected as of 4,000 B.Th.U., so making ample allowance between gross and net calorific value. The Irish 1928 Act deals mainly with the testing and stamping of meters, and places upon gas undertakings the onus of having all meters tested and stamped, at the undertaking's expense, within ten years of last stamping, a burden which is not imposed in respect of electrical meters.

In 1906, very little use was made of differential methods of charge. Some companies certainly did fix different meters for different uses of gas. This was both inconvenient and costly, and subsequently block systems and two-part tariff rates were evolved, in order to allow consumers to use extra gas at lower rates. We all know that extra gas can be made and sold cheaper than the basic quantity required to meet manufacture and overhead charges. The ideal method of charge, and incidentally the fairest to consumers, is unquestionably by means of a two-part tariff system, whereby each consumer pays a fair share of overheads, and the cost of gas is kept as low as possible. The electrical people appreciated this before we did, and adopted their rateable valuation, or similar two-part tariff systems of charging. They are again more fortunate than we are, in that they are entitled to make a minimum charge, which statutory gas undertakings are not allowed to do. We are, however, allowed to make contracts for the supply of gas, and, provided that the price of gas plus a service charge does not exceed the price at which we are allowed to charge under a Special Act or Provisional Order, we can charge under a two-part tariff. From my own experience, I have found the enormous advantage of this system, for the sale of both industrial and domestic gas. At one works, the system enabled us to obtain an industrial load, guaranteed at seven millions, and actually running into about twice this consumption. At another works, certain domestic consumers under the system increased their consumption by 215%. With the example of the largest gas company in the world before us, I suggest that it behoves us to introduce and popularize the two-part tariff, both to our own and our consumers' benefit.

A New Technique

The steady and intensive competition of the past thirty years has, I suggest, caused the main change in the Industry. Prior to the period we are considering, the gas man was an engineer pure and simple. Latterly, however, we have been forced to develop the commercial side of business. This has led to the introduction of elaborate showrooms, with a qualified selling staff, canvassers, demonstrators, and after-sales maintenance

staffs. We must now be in a position to match a gas fire to the general scheme of decoration, as carefully as a lady matches her hat to the dress she is wearing. It has placed the sales manager on an equal footing with the engineer. This has all called for a new technique, and though it makes the old true-blue gas engineer writhe, it has certainly put new life into the Industry, and, at the same time, it has certainly in no degree lessened the importance of the engineering side. For all the value of the sales department, profits are still made in the retort house.

What has been the result of all these changes? Despite the advances and advantages of our competitors, are we moribund? Figures are more emphatic than my views. In respect of Ireland alone, in 1906 the annual make was just under 5,000 million cu. ft., in 1938 the make was practically 10,000 million cu. ft., or just about double. Consumers have increased from 134,000 to 339,000 and the number of cookers in use from 26,500 to over 241,000. The number of public lamps even, despite popular prejudice, has only dropped by a few hundred, from 26,500 to 26,000.

When we consider all that we have been up against, and the steady improvement in efficiency of appliances which has saved gas consumption, we have no reason to be dissatisfied, ashamed, or alarmed at the future. We were an old Industry in 1906, and, like a popular beverage, we are still going strong.

It would be invidious to mention individual names out of the many who have so kindly helped me with advice and information. I should, therefore, in conclusion, like to convey my thanks to all those, both private individuals and firms, who have so kindly given me their assistance.

The Control of Gas-works Operations

Recording Appliances and Automatic Control Apparatus

By J. W. YOUNG, Monaghan.

A Paper presented at the Annual Meeting of the Irish Association of Gas Managers, July 25.

A modern gas-works may be described as a plant for producing and distributing a fuel in a convenient form suitable for general use. In addition by-products are produced, collected and worked up into various preparations.

It is logical that the great advance made in gas manufacture and by-products recovery during the past few years should have brought with it many additional uses of recording, indicating and automatic control devices.

In Fig. 1 is shown a typical gas-works layout, and on this are indicated some of the positions at which it has proved desirable to control or indicate pressures, vacuum, flow and temperature conditions.

Pressure and Vacuum Indicating Devices.

We are all well acquainted with the common U tube, and single tube gauges, such as might be used for indicating pressures and vacuum up to about 24 in. W.G. column, and where changes are not too small to observe. When a suitable filling (mercury) is used, the maximum range per unit length is increased by over 13 times. Of course, a special scale is required to read in terms of inches water.

For the measurement of pressures within the range 1 in. plus or minus from zero, inclined tube gauges are available. The tube in these indicators being placed diagonally, a small pressure change causes a much greater liquid movement on the scale. There is, however, a practical limit to the degree of amplification, as above a certain degree capillary attraction sets in.

The differential gauge such as might be used for indicating pressures absorbed by condensers, washer scrubber, purifiers, &c., is of similar construction, but the method of coupling up is different—one side of the gauge is connected to the inlet and the other to the outlet. The conditions indicated are a measure of the plant resistance. A gauge of this type is particularly useful as it will not blow, no matter how high the back pressure is, provided that the fault does not lie in the plant to which it is attached.

Some of the popular pressure recorders utilize a float which rises or falls according to changes in pressures. A pen is

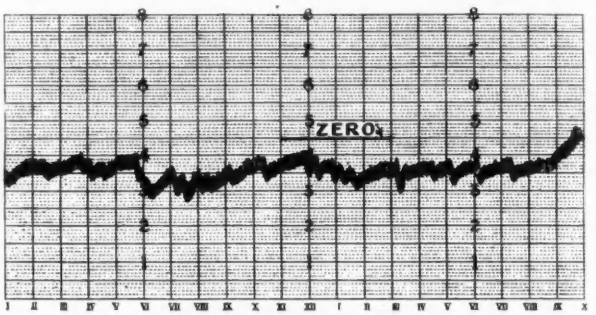


Fig. 2.—Example of vacuum changes necessary in order to maintain C.V. on a 9 mil. cu. ft. works. No producer gas available. Recorded directly at exhauster inlet.

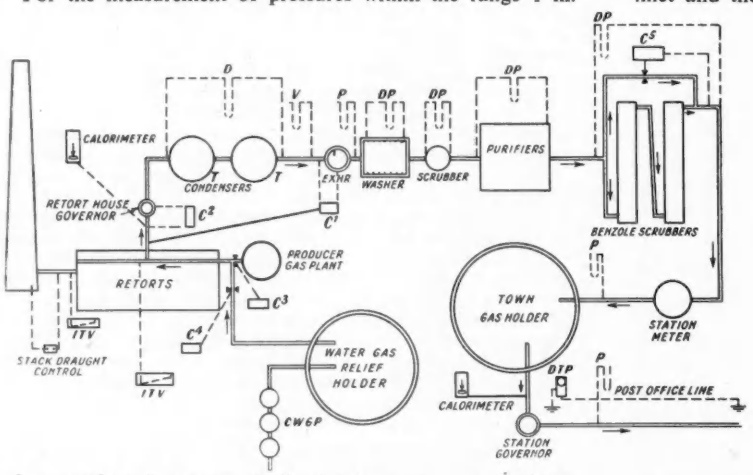


Fig. 1.—A typical gasworks layout:—ITV, inclined tube vacuum gauge; D, differential gauge; V, vacuum gauge; DP, differential pressure gauge; P, pressure gauge; T, thermometers; DTP, distance pressure transmission. Possible alternative positions for Calorific Value Automatic Control:—C^1, arranged to operate exhauster compensator; C^2, retort house governor; C^3, producer gas valve; C^4, water gas mixing valve; C^5, control degree of debenzolisation.

arranged to inscribe a record on a clockwork driven chart. There are, of course, many other indicators arranged for local and distant transmission.

Draught gauges as a rule are calibrated from 0 to minus 1 in. by 100 divisions, construction, inclined tube, diaphragms, aneroid, &c. It should be mentioned that a knowledge of stack draught is by itself no guide to economical working, but a record of its value is of advantage in assisting to keep conditions as constant as possible.

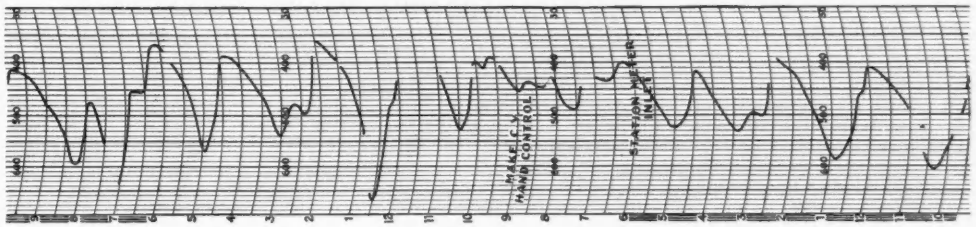


Fig. 3.—Actual chart obtained under manual control. Recorded at station meter inlet

Many types of thermometers are available:—Mercury in glass, mercury in steel, gas-filled, thermo-electric resistance and thermo-couple. For the high range temperatures, pyrometers employing simple electrical principles are used.

The composition of flue and producer gases is most readily controlled by the use of the Orsat type of apparatus, or a carbon dioxide recorder can be continuously in use. The adjustment of combustion gas and air mixtures is carried out by constant reference to the chart obtained.

Carbon monoxide recorders have not made, I believe, great headway, owing to the somewhat difficult physical properties of this gas, and also the relatively expensive fillings required. The use of such apparatus appears to be qualified.

Reference to the following Table will give some idea of the relation of waste gas to efficiency and percentage fuel lost.

Waste gases %.				Efficiency.	Conditions prevailing.
CO_2	N_2	CO	O_2		
20	80			61.7	Complete combustion.
17.4	78.2	4.4		49.3	Air 10 per cent. deficient.
18.2	80		1.8	58.2	Air 10 per cent. excess.
18.0	80		2.0	57.8	Excess air 18 per cent. CO_2.
18.0	78.7	3.3		55.4	Deficient air 18 per cent. CO_2.

The above table (Russell, "Operation of Gas Works," p. 30) shows how the efficiency of a setting fired by producer gas varies with the composition of the waste products.

The operations involved in the purification of gas are not so susceptible to automatic regulation as those involved in the production of crude gas. The supervision which can be applied consists mainly of the proper maintenance of temperatures and the regulation of the reacting agents.

Differential pressure gauges are particularly useful for indicating the drop in pressure experienced by the gas in its travel through any particular part of the plant. The temperature of the material in oxide purifiers is very important, as consistent results are only to be obtained if fluctuations in temperature are avoided.

The amount of free oxygen in the make gas also plays a big part in the effective purification process, and the use of the Orsat apparatus is recommended. As retorts get old, cracks will develop through which furnace gases, mostly CO_2 and nitrogen, will be drawn.

Provided that the same vacuum conditions be adhered to, it is obvious that the activating oxygen percentage must be reduced in order to maintain the quality. The solution is to patch the retorts.

Production of Crude Gas.

The vacuum on the hydraulic main is continuously noted on a recording vacuum gauge. This control is essential for the proper regulation of retort pressures. If vacuum be insufficient, the gas is likely to escape into the setting through any leaks which may have developed in the retorts. Insufficient vacuum also results in the excessive production of retort carbon.

A record of pressure conditions on the retort plant does not by itself give any considerable guide to the quality of the gas being made, as the average vacuum may at times require to be altered considerably to meet changed retort house conditions. A record does, however, show when chokes and irregularities are occuring.

It is most essential that the foreman in charge of C.V. be provided with a means for ascertaining the quality of the gas at the earliest possible moment after it has been generated.

On small and medium sized works the jet photometer has been used for this purpose, although a common flat frame burner takes some beating. The burner is preferably mounted inside a black box so that outside light does not affect the apparent luminosity. Care should, however, be taken to ensure that the same size and type of burner is always used.

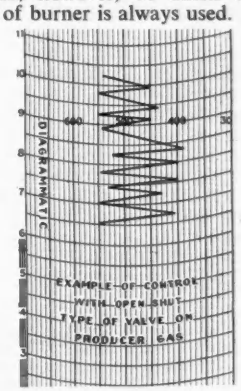


Fig. 4.—Example of control afforded with open-shut type of valve working on producer gas

The gas supply is usually taken from the exhauster outlet through a small purifier to remove tar fog. Instances are, however, quite common where the gas is returned from the station meter inlet. Indication lag under these two methods of connecting may, on a normal make, range respectively 10 minutes or more and up to one hour. The volume of plant to be swept is, of course, the deciding factor.

Recent developments have made it possible to obtain the gas supply direct from the foul main, immediately after any diluting gas inlet, or, if none provided, close to the common point on the foul main.

The system is simplicity in itself, a special type of gas pump is arranged to extract a continuous sample of the gas, which passes through a small scrubbing plant and governor to a test light. By these means an indication of make gas conditions may be ascertained in 1½ minutes or less; consequently exhauster control or other system can be very exact indeed, and a greater number of smaller weights may be used to give finer control. Your stoker will be unable to offer as

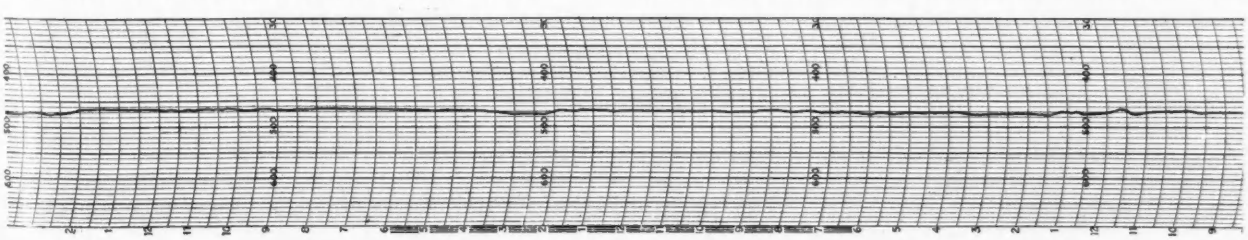


Fig. 5.—Chart obtained at outlet of small holder (45,000 cu. ft.) working in and out; 35 mil. cu. ft. works

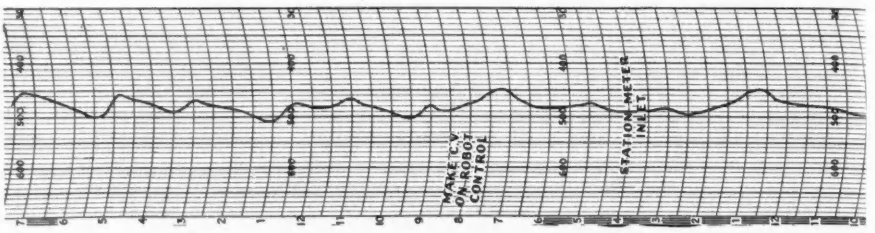


Fig. 6. Typical "make" record on full automatic control of 3 beds of 6 horizontals and P.M. producer gas. Recorded at station meter inlet

an excuse the statement that "The light has just gone, Sir." In three years of continuous work at the writer's works no trouble whatsoever has been experienced with the pumping plant.

In considering automatic control or robot operation with regard to the production of crude gas, a number of important points have to be considered, and these will be dealt with as they appear.

Many people have experimented with apparatus for replacing, shall we say, the exhauster foreman on a large works or the non-technical hit and miss methods of the average stoker on the small works. So far as the control of quality is concerned, the method consists in the proportional mixing of at least two gases, one of which may or may not be a combustible gas, but in any case of a lower quality than the main gas flow, which at its lowest average quality should not be lower than the declared calorific value.

Assuming, therefore, that the supply of rich gas is of a constant quality and the poor also of an even B.Th.U. content, then automatic control devices would consist of mechanisms that would mix these gases volumetrically in a predetermined proportion. The design of an automatic regulator would, under these conditions, be a simple matter, e.g., air/gas mixing venturi tubes as used in laundry equipment and industrial applications. Unfortunately, so far as a gas-works are concerned, and more particularly in the case of a small works, neither of these two conditions obtains.

We are likely to have:—

(1) Assuming that perfect exhaust governing be obtained at the hydraulic main, and that a straight line of vacuum be shown, the quality of gas evolved will vary according to the

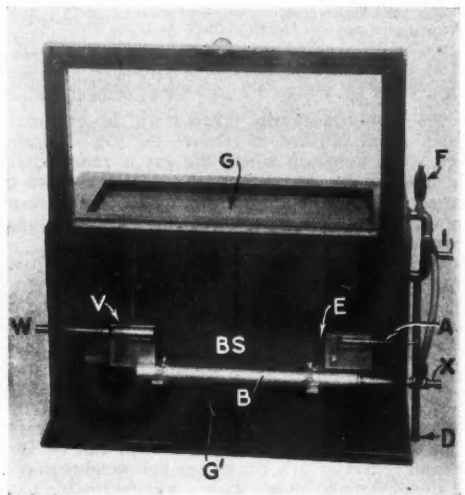


Fig. 7. Control Unit suitable for works of 6 mil. cu.ft. upwards A, Quality adjustment; B, burner (front shield removed); E, expansible element; F, flat flame pilot light; G, top gauze; G¹, bottom air inlet; D, condensation drain; BS, back burner shield; T, water valve outlet; V, water valve; W, water inlet from constant head supply; I, make gas inlet; X, town gas inlet

state of carbonization, the quantity of gas produced will also drop as distillation proceeds.

(2) The charging of coal into a retort which has been rapidly gaining heat during the last hours of its previous charge is bound to create a temporary abnormal flow of gas, due to the violent distillation of the coal directly in contact with the retort walls. When the surface of the coal is carbonized an insulating blanket is formed, and distillation proceeds at a normal rate.

Besides these factors there are others which at times are only too well known. Therefore, it is clear that a machine must be capable of compensating for, or at least of correcting to a reasonable extent, any of the variations that any or all of the conditions above may bring about.

The design of an automatic control for taking complete charge of a horizontal installation appears to have given con-

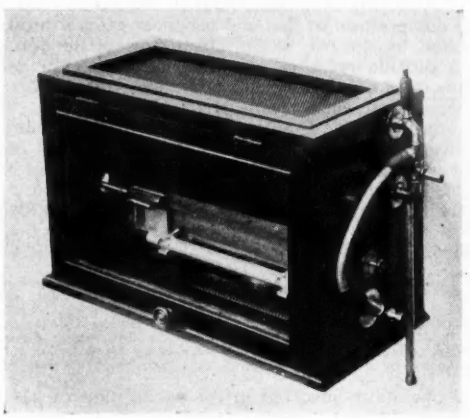


Fig. 8 Cabinet containing control unit

siderable difficulty, as the great majority of controllers on the market operate by regulating the admission of producer or other low grade gas through a controlled valve into the main gas stream.

The control on the main valve is generally of the open-shut type, which means that the controlled gas is allowed to beat within fairly wide plus and minus limits. The resultant chart appears as in Fig. 4, the C.V. maintained is the average of the beats or cycle periods.

Such a plant works well and will give very close control provided that the gas is carefully purified, otherwise the controller governors will cease to function.

The application of a machine to a horizontal retort plant with or without producer gas is quite different, as a large magnitude hunting effect would prove undesirable. Loss of gas would undoubtedly take place on the one beat, while on the other overpulling would occur.

Adjustments are available whereby the frequency of this hunting could be controlled within limits, but it must be remembered that such an adjustment must, of necessity, slow down the response of the valve to sudden changes caused by, say, the charging of a retort or retorts, thereby bringing about a period of under-exhausting.

In practice the degree of cycling or hunting phenomena is determined by three factors.

(1) The speed with which a sample of the gas can be brought to the machine (reckoning from the last movement of the main valve).

(2) The heat interchange lag in the controlling instrument itself (few calorimeters of the non-liquid flow type will give full deflection to changes of C.V. in less than 15 minutes).

(3) The variable lag brought about by variations in the average flow of the gases from the point of production to the position at which the sample is extracted from the foul main.

In view of these facts the design of a controller must embrace the following features:—

(1) The gas must be pumped by some means so as to arrive at the burner within a minute or so after it has been generated.

(2) On arrival at the burner the element must become fully heat-saturated in a matter of seconds only.

(3) The controlled valve movement must be gradual and capable of settling down to a position without appreciable hunting.

Having made clear some of the principles involved, I will now proceed to describe one of several installations of automatic control already in use.

In Fig. 7 a cabinet will be seen in which is mounted the control unit, which consists of a metal base, a burner and expansible element which is connected to a water valve arranged to open with increase of quality and close with a drop in calorific value.

The inlet of the valve is connected through a gauze filter to a constant head water supply. The outlet is piped to a small loading tank mounted on the weight loading arm of the

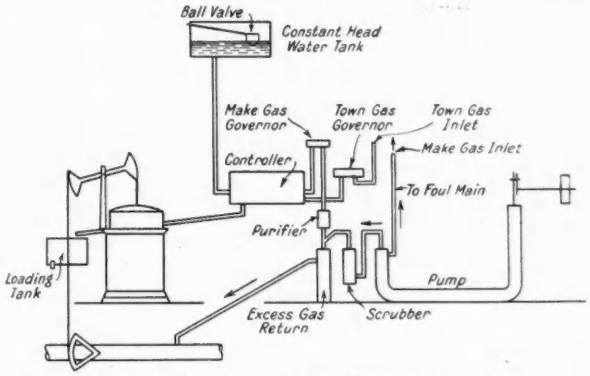


Fig. 9. Diagrammatic Layout of C.V. control as applied to exhauster compensator governor on small works.

exhauster or other governor. At the bottom of this small tank is mounted an orifice and head regulator.

In action, water is continually flowing from the loading tank at a constant rate, while the water flowing into the tank is variable according to the quality of the gas.

When, however, the gas is at control point the flows will balance and the controlled valve will be maintained at its position. The valve is, of course, subservient to the movements of the exhauster or retort house governor bell, which continues to exercise its governing effect. Any deviation of the gas from control point will thus result in a loading or unloading effect on the governor with consequent vacuum changes. No producer gas is available on the works and regulation is by air and overpulling. Owing to the extremely low beat and time lags on the instrument the valve quickly settles down.

The gas is pumped from a point in the foul main, and most of the tar fog is liquefied at an early stage on the pump inlet line by passing the gas through a scrubber. On the outlet side of the pump is another scrubber and a pair of small purifiers filled with sawdust for removing any remaining traces of tar fog, and yet incapable of caking and offering resistance to the passage of the gas.

The pump has a capacity much in excess of the requirements of the controller, and arrangements are made for returning the excess gas to the mains. The large pump capacity ensures a quick scour out of the pipes and a reduction in time lag.

The pressure governors are of a special type capable of handling crude gas. If the valve fails to seat, pressure will not be increased as the excess gas will leak away. They are all-metal construction, and the degree of reliability is very high.

In addition to the make gas entering the machine, a supply is brought back from the holder outlet (assuming that one is working in and out). This gas, it has been found, exercises a very high corrective effect on the average of the make. In practice, the control alters the range of water valve movement in such a way that town gas deviations, should they occur, result in the subsequent make being stepped either up or down, according to the deficiency.

The design of the pump is such that packing glands, piston rings, precision fits are eliminated. Because of the construction there can never be, in any circumstances of wear, any leakage of gas or indrawing of air.

Where a P.M. producer plant is used for dilution a small alteration to the level of liquid in the scrubber affixed thereto is necessary, this can be done in a few minutes.

Reference to the diagrammatic layout will make the general arrangements quite clear. A number of charts (see Figs. 2, 3, 4, 5 and 6) are shown bearing descriptive matter which will be self-explanatory.

In conclusion it should be mentioned that the device is the subject of several patent applications.

Discussion.

The **President** (Mr. George Anderson, of Kilkenny) remarked that he was sure all present would join with him in congratulating Mr. Young on his most interesting paper, over the preparation of which he must obviously have taken very considerable trouble. If anything, the author had rather erred on the side of modesty. It was entirely by his own exertions that he had evolved his controller which it seemed to him should be of very great value in particular on the really small works. Some of the members, at any rate, would realize the violent fluctuations in calorific value that were liable to take place on a works where perhaps it might be necessary to close-down over the week-end, and the holder would be almost empty on Monday morning, when gas making was resumed, and rich gas was sent out. In this way, until things gradually settled down again, there would quite unavoidably be fluctuations which would never be allowed on a large works, where constant and strict control was applied. Obviously, if the calorific value could be controlled by this controller, it would remove a lot of the difficulties with which the small works were now faced. Mr. Young was now installing a controller in one of his works, and he would be extremely interested to see what the results might be.

A Step in the Right Direction.

Mr. **J. M'Nicholl** (Cork), moving a hearty vote of thanks to Mr. Young for his useful paper, said that at the meeting of the Association in 1933 the author had given them a paper entitled "A Straight Line of Quality," which, so far as he remembered it, dealt with the control of carbonization in such a way that the present paper could be taken as being complementary to it. The author was evidently much interested in retort house control, and it was a subject which must inevitably appeal to a meeting such as theirs. The point upon which their attention must be centred chiefly was the control unit, which was very ingenious. How long had it been in action, and did it require a great deal of supervision? Mr. Young had rightly stressed one of the most troublesome factors in matters of this kind, which was time lag. Anything that would have the effect of reducing this would be a step in the right direction, and he could quite imagine that on many works an arrangement such as had been described by the author would prove very useful. The time lag was reduced very much, and if the man in charge was provided with an equipment of this character he could keep a very close eye on the working. Ideal automatic control would be attained when they had a machine that responded as rapidly to gas quality changes as a governor did to changes in gas pressure. On a large or medium sized works, where there were a number of retort houses or benches, the equipment might present certain difficulty, unless it were housed in a practically dust-proof chamber. The paper had been of great interest to him personally, and he hoped that it would lead to the receipt by the author of a great number of enquiries.

No Complaints.

Mr. **John K. Harrison** (Armagh) remarked that he had read Mr. Young's paper, and he found no reference in it to results. He was sure that every engineer present at that meeting would like to hear something of what the machine was doing under actual working conditions. Now, Armagh, he believed, was the first works to have a controller installed, and he purposed very briefly to give them the results of his experience. Before the introduction of the controller, he had been cursed with choked ascension pipes, but since the controller was installed some nine months ago this trouble had practically ceased, and the make of gas had increased by 1,000 cu.ft. to 1,500 cu.ft. per ton. The gas had been so uniform in quality that during the last nine months he had not had a single complaint in the district—which was certainly a change from what was experienced under hand-

operated control. The charts Nos. 3, 4, 5, and 6, as reproduced in the paper, were from the Armagh works, and he thought they showed clearly the difference in conditions before and after the introduction of the controller.

Perhaps he should say something regarding the construction of the machine. The pump was unique in that it had no piston rings, no cup leathers, no packing glands, and nothing likely to require renewal for at least twenty years. The construction made it absolutely gas tight under working conditions. In his particular works, even though the engine room was a considerable distance away, an indication of the effects of a vacuum change was noticeable within two minutes. Mr. Young, however, had designed a special type of master pump which would transmit its impulses to a pumping cylinder. This cylinder might be fixed in the retort house, or any other position desired. The machine was so sensitive that a full opening of the relay valve was obtained within 10 seconds of the change in gas quality. He had originally an electrically controlled model, also designed by Mr. Young, which, he confessed, rather appealed to him, and he thought that possibly more might be heard of this in the near future.

They owed a debt of gratitude to Mr. Young, not only for his valuable paper, but also for the excellent machine which he had produced as the result of many years of experimenting. He (the speaker) had been listening to papers read at the meetings of this Association for over thirty years, and he believed that the idea embodied in Mr. Young's contribution was the only idea he had heard the practical working of which lifted part of the heavy burden from the shoulders of the gas manager.

More Peace and Quiet.

Mr. **F. J. Edmonds** (Waterford) said he was in agreement with very much that had been said by the previous speakers, with whom he would like to join in offering congratulations and best thanks to Mr. Young. It was often said that the best paper was one which would give food for thought to the audience when they got home, and no paper that had ever been produced before the Association was ahead of Mr. Young's in this respect. He had given them hope that in future they might, as the outcome of his device, enjoy a little more peace and quietness in their works. It was in the small works probably that his invention would give the best results. Stokers were apt to allow their attention to the important matters to be relaxed when attending to some of their physical work. He wondered whether the idea was created in the brain of Mr. Young when he was an Assistant at Waterford, where he made experiments. Anyhow, he had presented them that day with a paper which would appeal to the Industry as a whole, even though it might be said that the apparatus for the moment was intended primarily for the small works.

In Fig. 1, five alternative positions for the machine were shown. In one of these positions, the apparatus was controlling the debenzolization of gas, which should be of great value to a large works.

To him (Mr. Edmonds) it seemed to be a great pity that they had not in Ireland some organization or works which would take up a device, or an idea, such as that which had been described in the paper before them, and then, in collaboration with the inventor, endeavour to develop it for use in the larger works. They lacked, on their side of the water, an undertaking which would amplify and test an idea such as that of Mr. Young, who was to be complimented from the point of view that he had been "doing something." He had been experimenting, and doing what a good many more of them should be doing. Ever since he had known Mr. Young as a child, he had been experimenting, and it was a delight to hear of this development of his activities. Whatever might be his success, he merited their sincere thanks.

The Institution President.

Mr. **George Dixon** (Nottingham), who was cordially received by the members, said he would like to add his mead of thanks to the author. The President, in the Address which he had delivered at an earlier stage in those proceedings, had made reference to the intense growth of competition, and then, just towards the close, he had quoted some comparisons and statistics relating to the advance of the Gas Industry between 1906 and 1938. These figures revealed a record of remarkable progress. Now, he would suggest that this progress had been made largely because of the growing competition. One heard almost daily about this increasing competition. He himself felt inclined only to say: "Thank God for it," because he believed it had been the salvation of the Gas Industry.

The paper was one which, by suggesting better control of gas-making operations, held out promise to them of a much easier life, because of freedom of trouble on the district. It was true that Mr. Young's apparatus had been designed for a rather smallish type of works, but nevertheless it seemed to be an idea which was going to be capable of development not only in their small works. There were now scientists in many of the big works who were capable of developing ideas to meet their own requirements. At the moment he was himself considering some method of controlling a supply of coke oven gas to mix with his own coal gas. He wanted something which would control matters and give him a constant calorific value whatever his gas might be. In other words, he needed some automatic device which would give the dilution required for a straight-line gas. Thus what he had heard that morning might alone have more than justified his visit to Ireland. It had given him an idea which he thought was going to be of great use to him and to the undertaking which he served. He would have liked some results, and particularly to know what quality of gas the author was sending out, and what was the amount of dilution gas he was having to put in.

Mention had been made by Mr. Edmonds of the need of some co-operative development centre such as had been established on the other side of the water. He (Mr. Dixon) felt very strongly that the time had arrived when there should be a little more of this kind of co-operation between one works and another. There should be a clearing house of information, where the results of work being done would be recorded, and open to everybody to see and take advantage of. There was a great advantage in central control, inasmuch as this made it possible to provide technical men who could give assistance to works whose small size must otherwise make it beyond their means to secure such help. It was by central control that they were getting over this difficulty in England. The Association were to be congratulated upon being able to produce a member who could come forward and give them information as valuable as that which had been supplied by Mr. Young that morning. (Applause.)

Mr. **A. S. Brook** (Lisburn) remarked that he was greatly interested in the way in which certain technical difficulties had been overcome. He might say that his son and himself had carried out experiments in connexion with auto-control, and had attempted to give the necessary movement by mechanical means to the bell of the steam governor. He would like to know whether the author had experienced any annoyance from sooting-up of the burner.

An Increased Make Per Ton.

Mr. **D. M'Intyre** (Dungannon) remarked that he had several months ago made an installation of this control unit, and, as the result of his experience, he would like to state that he was certainly obtaining a greater make per ton of coal. The gain, he thought, was in the neighbourhood of 1,200 cu.ft. per ton. He could say that no claims had been advanced that were not substantiated in practice.

Mr. **Young,** in the course of his reply to various points that had been raised in the discussion, dealt first of all with the questions that had been put by Mr. M'Nicholl. He said that the response was for all practical purposes instantaneous. Mr. M'Nicholl's remarks were greatly appreciated by him, and he might say that he had an arrangement for pumping the make in such a way that a quick indication was obtained. This he found over several years had been of the greatest value when ordinary hand control was used. With regard to the installation of the device in a works containing more than one retort house, he would suggest in this case that control be accomplished by mixing a lower grade gas at the common point of the retort house outlets. So far as dusty atmosphere was concerned, provided the governors were covered there would be little else to give any trouble from this cause. Mr. Brook had raised the question of sooting-up of the burner. This had occurred during the experimental stage, but there was now absolutely no possibility of it taking place. In reply to Mr. Edmonds, he would say that experiments had been carried out at Waterford, and the experience obtained on a works of that size had materially added to the successful development of the invention.

Mr. **Edmonds** enquired what would be the approximate cost of installing the apparatus in a works making up to 9 million cu.ft. of gas.

Mr. **Young** replied that he would have to answer this question with reserve, but he would be inclined to think that the price would be considerably under £40. In answer to the remarks made by Mr. Dixon, the author said that it would not be possible at the moment to give details of how the mixing job which Mr. Dixon had in mind could be done, but he would look into this matter, and would be pleased to give further information later on.

New British Standards.

Definitions for Welding.

A revision of B.S. 499 has just been published by the British Standards Institution. The British Standard Nomenclature, Definitions, and Symbols for Welding and Cutting was first issued in 1933 under the authority of the Mechanical Industry Committee. It included a scheme of symbols for indicating welds on engineering drawings based on the use of letters to show the general form of the weld with the suffix and number relating to the details. The scheme has, however, not found general favour as being somewhat too complicated.

The Committee has, therefore, reconsidered the matter and has had before it certain proposals of the Institute of Welding which are based on the use of diagrammatic symbols indicating only the more generally used forms of welds. The new scheme follows closely the lines suggested for international standardization.

The modification to the symbols has necessitated a considerable alteration to the form in which the different welds are defined in the glossary. The definitions have been reviewed and have been brought up to date. The extent of the modifications to the definitions is, however, comparatively small.

It is hoped that in its simplified form the scheme of symbols now recommended will be acceptable to industry. The Committee, while appreciating that the introduction of this scheme in drawing offices, to supersede present methods, may occasion a certain measure of inconvenience, hopes, nevertheless, that in the interests of national co-ordination, the scheme will be widely adopted.

Added importance is attached to the revision of the Standard as the L.C.C. require the symbols on drawings submitted to them for approval to be in accordance with the British Standard.

Copies of the British Standard can be obtained from the British Standards Institution, Publication Department, 28, Victoria Street, London, S.W. 1, price 2s. (2s. 2d. post free).

Welded Steel Boilers.

Two further additions have been made to the group of British Standards dealing with land boilers. These are two specifications for welded steel boilers, one for steam central heating (B.S.854) and the other for hot water central heating and hot water supply (B.S.855).

The specification for steam central heating boilers covers boilers for operation at pressures not exceeding 30 lb. per sq.in. and the specification for hot water boilers covers boilers of over 5 sq.ft. heating surface for operation at pressures not exceeding 65 lb. per sq.in. (150 ft. head) or at temperatures exceeding 212° F.

Both specifications provide for the materials to be used and give formulæ to be used in calculating the scantlings. Another section covers the requirements with respect to construction and workmanship, full details in connexion with the forms of joint to be used, being given.

A further section gives the requirements for mountings and other appliances, this being amplified in the steam boiler specification by the inclusion of a clause on pressure gauges.

Copies of these specifications may be obtained from the British Standards Institution, 28, Victoria Street, S.W. 1, price 3s. 6d. each (or 3s. 8d. post free).

Test Code for Furnaces.

A British Standard Code (No. 859) has just been issued dealing with the testing of continuous and intermittent furnaces with or without recuperators or regenerators, for heating and heat treatment purposes.

It provides for two forms of test, viz.: Part 1. A short, simple code for carrying out, at minimum cost, simplified industrial tests for evaluating the performance of furnaces as effective and economic units. Part 2. A comprehensive code for the complete evaluation of the performance and the efficiency of furnaces.

The Code is applicable to mill and forge furnaces for the continuous and batch heating of ingots, slabs, blooms and billets and to a wide range of fixed hearth, bogie, and conveyor type furnaces employed by the iron and steel industry for the reheating and heat treatment of rolled, forged or cast products.

It is also applicable to certain furnaces used in the non-ferrous and other industries.

The Committee responsible for drafting this Test Code have endeavoured to make it as comprehensive as possible in regard to its application, and, although various specific types of furnaces are provided for, it must be realized that other types exist and still more will be evolved in the future.

The Code may therefore not be applicable to all such furnaces, but, nevertheless, will serve as a guide.

Copies of this new British Standard (No. 859-1939) may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W. 1, price 2s. each (2s. 2d. post free).

Gas Undertakings' Results

Boston.

The Boston (Lincs.) Gas Light and Coke Company, whose accounts are made up annually to June 30, have made further successful records in the twelve months that have just expired. As compared with those of the preceding year, sales of gas show an increase of 3,193,000 cu.ft., or 1¼%. A year ago, also, a small increase was reported, so that the business is a steadily progressing one. In 1938, too, the Directors reported that they had decided to make a further reduction in the price charged for gas of 0·2d. per therm, and this has been followed on the present occasion by yet another reduction—this time to the extent of 0·4d. This is in spite of the fact that the price of coal during the year shows an increase over that of the previous year. The consumers are to be congratulated upon the fact that since 1922 the price of gas in Boston has been reduced by 37%. Capital expenditure has continued on the laying of new mains and service pipes—this work naturally accompanying the constant expansion in sales. Over the past ten years sales of gas have increased by practically 21%—from 697,673 therms to 843,474 therms. The proprietors are also directly benefiting from this flourishing state of affairs by an increase in the dividend as compared with that paid a year ago; the rate now declared being £9 19s. 9d.% on the old shares and £8 4s. 6d. on the new shares. Another excellent result of the increased prosperity of the Company is the introduction of a Pension and Life Assurance Scheme for the benefit of the employees. The scheme has been prepared by the Prudential Assurance Company, under the ægis of the National Gas Council, and 100% of the eligible employees are ready to take advantage of it.

Leicester.

A further advance was shown in the price of coal, and with the falling out of some of the lower priced contracts the full force of the increase in price was felt by the City of Leicester Gas Department during the twelve months ended March last. At the same time, the net receipts from coke, tar, and sulphate of ammonia, together showed a considerable decrease as compared with the previous year. This, however, was in some measure due to a lower tonnage of coal carbonized, with a corresponding increase in oil used for carburetted water gas. The price of gas oil was reduced by ½d. per gallon during the year. There was a trifling increase in the quantity of gas sold and accounted for at 2,557,260,000 cu. ft. An increase took place of 1,165 in the number of consumers, making the total at March 94,843. Of these, 22,067 had taken advantage of the terms of the alternative two-part tariff—the majority being prepayment consumers. Very considerable progress continued to be made in the sale of gas for industrial, commercial, and central heating purposes. For central heating alone, some 75 additional installations have been secured, bringing the total of such plants installed to 244. The Committee's decision to increase the price of gas as from the Midsummer meter readings in the following financial year was due to adverse conditions beyond the control of the Department. For the year to March last, the net revenue account shows a deficit of £17,374. The price of gas had remained unaltered since 1929; improved residual markets and economies in working having obviated an increase earlier. Work on an 18 in. high-pressure main which is to link-up the Aylestone Road works and the Belgrave Gate works has been completed, including the installation of Michell crankless compressors at the former works.

Loughborough.

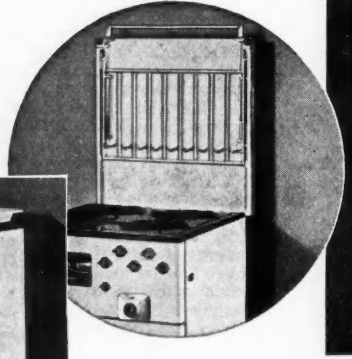
A net profit on the operations of the Borough of Loughborough Gas Department for the year to March last of £2,498 compares with the previous year's figure of £1,405. The average price of coal purchased during the year showed an increase of 2s. 7d. per ton over the previous year's price, representing an additional cost of approximately £1,420. The total sales of gas amounted to 194,253,800 cu.ft., an increase over 1938 of 36,630,900 cu.ft., or 23·2%. Sales in Loughborough totalled 154,220,400 cu.ft., representing an increase of 6,419,000 cu.ft., or 4·3%. In the Quorn area 40,033,400 cu.ft. were sold, an increase over the quantity sold there during the year prior to the purchase by Loughborough of the Quorndon undertaking of 4,946,000 cu.ft., or 14·1%. Of the total output, industrial and commercial consumers took nearly 17½%. The whole of the carbonizing plant was working to full capacity during the week before Christmas, and in view of this it has been decided to extend the retort house and provide further retorts. As the result of the acquisition of the Quorndon undertaking, expenditure has increased by £8,204, while income has

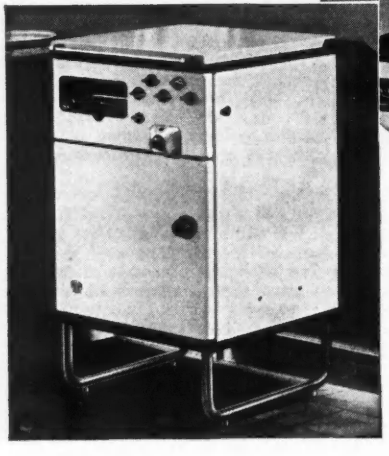
VARIETY

"Heading the bill" is the 57 "Cabinet" Cooker with the "P.R." Hot-Closet. This "double act" presents an attraction which will appeal to all. Other "features" are the well-known Main Plate Racks and Backplates, and also the Hinged Cover. The latter has already met with a "great reception," especially when "teamed" with the ingenious Folding Chromium-plated Plate Rack. This, opened for use, is absolutely rigid and yet it folds back into the cover with ease.
Another attraction of the Hinged Cover is the novel locking device.

The illustrations from left to right show :—

1. The 57 Cooker with tubular legs and Hinged Cover closed.
2. The Hinged Cover open, with chromium Plate Rack folded down.
3. The 57 Cooker with cast iron legs and the "P.R." Hot-Closet.





No. MAIN 57

"CABINET" GAS COOKER

In Ivory & Black or White & Black Deluxe Mainamel

★★★★R. & A. MAIN LTD. LONDON AND FALKIRK★★★★

gone up £10,448 without any increase in the prices of products. The loan liability per 1,000 cu.ft. of gas sold, which in 1904 was 24s., had been reduced by March last to 11s. 8d.

Manchester

During the financial year to March 31, the output of gas by the Manchester Corporation Gas Department was 6,775,512,000 cu.ft., an increase of 2·03% as compared with the previous year, and is the first increase to be recorded since the year ended March, 1931. The quantity sold, on the other hand, shows the trifling decrease of 0·45% on the preceding twelve months; the principal cause of the sales not reflecting the increased output being the fact that this increased output occurred in the last few weeks of the financial year, at which time nearly the whole of the meter readings had been effected. A substantial quantity of new business, mainly industrial, was secured during the year. Practically 28½% of the total sales were on the optional two-part tariff. The quantity of gas consumed for industrial and commercial purposes was 35·11% of the total sales. Special contracts, including bulk supplies, have now been made with 160 consumers; the total annual supply thus assured being estimated at 1,103,000,000 cu.ft. The price of coal has now been increased to the extent of 4s. per ton, or 21%, since the introduction of the various District Coal Selling Schemes; but notwithstanding the increased coal bill of approximately £75,000 a year, an increase in the price of gas has so far been averted. In the past twelve months the net cost of coal and oil increased from 5·5d. to 7·87d. per 1,000 cu.ft. of gas sold. The net profit on the year's working is £101,221, which compares with £184,664 for the previous year. In connexion with air-raid precautions, a number of isolation valves have been fixed on the leading mains throughout the city.

Middlesbrough

An increase of over 2½% in gas sales, as compared with the previous year, is reported by the Middlesbrough Corporation for the twelve months to March last; the actual quantity sold having been 1,332,090,000 cu.ft., against 1,299,275,250 cu.ft.—an increase of 32,814,750 cu.ft. The number of meters in use, at 38,468, shows an increase of 694 over the previous year. Additional business has been obtained in the use of gas for central heating installations; the quantity consumed for this purpose during the past twelve months having been 83,000,000 cu.ft.—an increase of 65% on the preceding years. Over the year 145 additional gas lamps were erected. Two sections of main roads have been lighted to the Ministry of Transport standard. The number of gas lamps in use at the present time is 3,383, and the miles of streets lighted total 112¾. The net profit on the year's working of £17,503 compares with £22,362 for the previous year. This decrease of £4,859 has been due to the closing down in July of the Newport coke ovens, necessitating the bringing into operation of stand-by plant at the gas-works. This plant, which had been out of use for twelve years, was brought successfully into operation, but it is of an obsolete type costly to operate, so that the charges for gas had to be increased.

Oldham

The net profit on the working of the Oldham Corporation gas undertaking for the twelve months to March last was £11,879, from which the sum of £4,000 has been contributed to the Borough Fund. For the previous year the net profit was £16,507. The average price realized for the gas sold during the past year comes out at 2s. 10·66d., as compared with 2s. 10·59d. in the previous twelve months. For industrial purposes, the scale of charges descends, according to consumption, to as low as 1s. 4d. per 1,000 cu.ft. net, which is also the price charged where a gas-fired boiler is installed for central heating or steam-raising purposes. A two-part tariff is in operation, with a commodity charge of £2 per annum per house (paid quarterly) and gas at 2s. 3d. per 1,000 cu.ft., less 6d. per 1,000 cu.ft. discount. The quantity of gas manufactured during the past year was 1,468,571,000 cu.ft., as compared with 1,490,740,000 cu.ft. in the previous year. The actual number of consumers on March 31 last was 61,852 (nearly 46,000 prepayment). At the same date there were 2,300 meters fixed, but not in use. The quantity of gas consumed in houses and shops decreased by 10,201,300 cu.ft., while in that used for mills and workshops there was a falling-off of 8,916,600 cu.ft. The amount of gas consumed in public lamps increased by 869,000 cu.ft., to 109,135,000 cu.ft.

Smethwick

The quantity of gas sold during the year ended March 31 by the County Borough of Smethwick Gas Department amounted to 1,023,601,100 cu.ft. When compared with the preceding year, this is a reduction of 31,774,100 cu.ft.—a slight decrease attributed to the trade recession and international situation prevailing during the period. As a matter of fact, in the final quarter there was a considerable increase over the corresponding period of the previous year. The additional cost to the undertaking in respect of coal, as compared with prices prior to the establishment of the Coal Selling Scheme, will now be round about £12,500 annually; and these rising costs have unfortunately compelled the making of a slight increase in the price of gas during the twelve months. A contract in connexion with the reconstruction of the vertical retort installation has been completed. The consumption of gas for public lighting continues to grow. A net profit of £16,910 compares with £20,506 a year ago. The proportion of gas sold for industrial purposes in the past twelve months was 46% of the total.

Stratford-upon-Avon

A General Rate Fund Contribution of £750 (the same as for the preceding year) is provided for in the accounts for the financial period to March 31 last of the Stratford-upon-Avon Corporation Gas Department, and in spite of increased costs the price of gas remains at the present favourable level, to which it was reduced in 1936. During the past year the business of the undertaking continued to expand; gas sold and accounted for, at 171,326,300 cu. ft., showing an increase of 4,213,600 cu. ft, on the preceding year. The consistent yearly increase in output of gas has necessitated an extension of the purification plant; and if this growth continues, the time will rapidly approach when a scheme for further extensions of plant will have to be considered. The cost of the two new purifiers, for which the tender of Messrs. Westwood & Wrights, Ltd., of Brierley Hill, has been accepted, is to be met out of the balance which has accrued from year to year on revenue account. The net profit for the past year is £1,677, which compares with a figure of £1,636 for the previous year—an increase of £41.

Athletic and Social

Blackburn Social and Benevolent Club

The Social and Benevolent Club of the Blackburn Corporation Gas Undertaking at Greenbank, which has a membership of over 200, has fully justified its formation over 12 years ago. It performs a very useful service to the members, and it also stimulates a spirit of fraternity and fellowship among staff and employees by periodical gatherings.

On July 29 the Club held its first open gala, which it is intended shall become an annual event. The President of the Club is Councillor H. Johnson (Chairman of the Gas Committee). The Vice-Chairman, Ald. Reuben Culshaw, acted as M.C. for the gala. There was a varied programme, including bowling competition, tennis tournament, balloon release contest, and other novelties.

Back row (left to right): Messrs. Eric Culshaw (Publicity Organizer), W. Hammond (Treasurer), H. Sharples, J. Farrell (Sports Chairman). In front: Mr. E. B. Field (Deputy Manager), the Mayoress (Mrs. Lambert) the Mayor (Ald. F. J. Greeves, J.P.), Ald. R. Culshaw (Vice-Chairman of the Gas Committee & M.C.).

Mr. J. D. Ashworth (the Engineer and Manager) was unable to attend owing to absence on holiday in the South of England, but he was represented by Mr. E. B. Field, the deputy Engineer. The Mayor and Mayoress, Ald. F. J. Greeves, J.P., and Mrs. Lambert, were heartily welcomed to the gathering, and they expressed themselves delighted with the facilities which exist for the social welfare of the Greenbank staff.

Mr. H. Sharples (Secretary) was responsible for the arrangements, and he had the assistance of officers of the social, bowling, billiard, tennis, football, cricket, savings bank, and benevolent sections.

Trade News

Protection of Iron and Steel

Messrs. Detel Products, Ltd., send us particulars of "Detel" Metal Undercoat, which does not depend on synthetics for its protective powers. Though a special form of chlorinated rubber is used as a binding material, its protective properties depend to a very large degree on the high proportion of metallic zinc which enters into its composition. "D.M.U." gives a quick drying coat which contains over 92% of metallic zinc and which is definitely porous before exposure. Its high zinc content makes it more closely resemble the coat obtained by galvanizing or sherardizing than that of paint. Its protective action depends almost entirely on its zinc content as is the case of galvanizing, but there are several important points of difference. First there is no easily decomposable alloy of iron and zinc formed as an intermediate layer, and secondly, because the zinc is discrete and not continuous, the zinc salts formed during its sacrificial attack combine with unaltered zinc, forming oxy-salts which harden and fill up the film. It follows from its composition that "D.M.U." is best applied direct to the surface of the metal, but this is not essential as it gives almost as good results when brushed on top of one or two existing paint films, which, of course, must be sound.

Small Parts with Big Responsibilities

Taps and lubricators, oil pumps and pipe joints, filters and indicators, and similar parts, insignificant in size, often carry a weight of responsibility out of all proportion to their size and cost. If a fuel tap leaks or an oil line fails the damage caused is likely to be costly. In recent literature dealing with small parts having big responsibilities, Rotherham, Ltd., state that safeguard against such failures can be assured by specifying "Rotherham" specialities for all non-ferrous small parts. The name "Rotherham," the firm add, stamped on a tap or lubricator is a guarantee of quality that is known and trusted in every industry. Among the many specialities of Messrs. Rotherham are time lags, industrial clocks, and instrument parts.

"Durasteel" Roofing and Fire Protection Panels

Some convincing results of experiments carried out to prove the efficacy of "Durasteel" roofing and fire protection panels under conditions closely representing those obtaining in an air raid, have been published in three illustrated brochures which we have from Durasteel Roofs, Ltd., Oldfield Lane, Greenford, Middlesex. Among prominent purchasers of these materials are many of the larger gas undertakings in this country.

"Vitreosil" Immersion Heaters

Many users of acid baths—*e.g.*, in pickling and plating, heat by gas and would use immersion heating if they were sure of adequate resistance of the heater to corrosion. The Thermal Syndicate, Ltd., Wallsend, have developed the "Vitreosil" gas immersion heater for such work. The envelope is of "Vitreosil," pure fused silica, thoroughly resistant to acids, except hydrofluoric, at all temperatures up to 1,100° C. Its high resistance to prolonged heat or sudden changes of temperature is stated to be remarkable. Connexion of the "Vitreosil" immersion heater to a supply of gas is easily made by flexible tubing.

Stock Bakelite Moulds

A new folder of fittings from stock Bakelite moulds has been published by Messrs. Evered and Co., Ltd., Surrey Works, Smethwick. The firm have a large and varied range, and several of the fittings shown in the folder are of particular interest to manufacturers of gas cookers, refrigerators, and similar products.

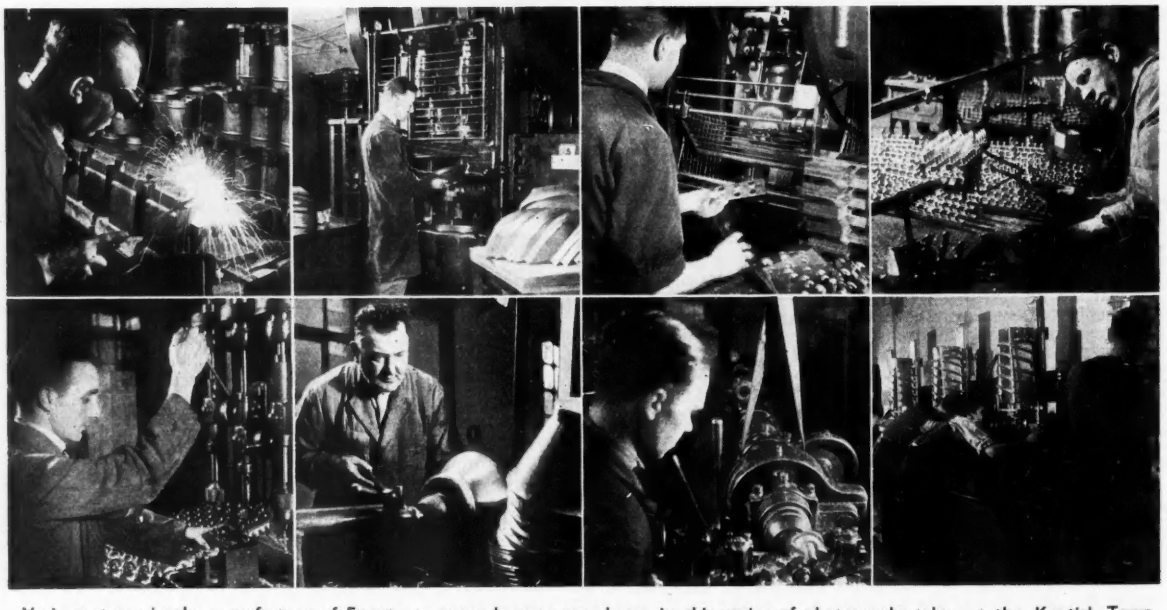
Messrs. Evered will be pleased to send a copy to anyone interested.

New "Morris" Slings

It is fatally easy, when there's lifting to do, states a recent brochure published by Messrs. Herbert Morris, Ltd., Loughborough, to pounce on the nearest piece of rope or chain and improvise a rough and ready sling. But this is risky because it does not allow for the many things which affect even the simplest sling. Not every chain is made for lifting and it is obvious that ropes can quickly deteriorate. An improvised sling is therefore much too apt to involve danger for the user. It should be remembered that a sling is just as responsible as the lifting gear to which it is attached. The full standard of safety of lifting gear can be maintained by using a correctly designed, expertly manufactured Morris sling.

There is much more in making a sling than appears on the surface; in the Morris chain shop there seems to be more testing going on than manufacturing. This is not quite the case, of course, but it does mean that every piece of Morris chain and every Morris sling is thoroughly tested before it is allowed to leave the works. Good sling designing too, is just as necessary as good craftsmanship in manufacture. Here again the Morris service gives only the best—and will save money as well, in the shape of improved methods of dealing with your goods during the handling stages. A well-designed Morris beam-sling, for example, might handle four loads at a time instead of one.

Stages in the manufacture of Gas Water Heaters



Various stages in the manufacture of Ewart gas water heaters are shown in this series of photographs taken at the Kentish Town Works of Messrs. Ewart & Son, Ltd.

A Combination Grate with Refuse Destructor

The regular and rapid disposal of domestic kitchen refuse is a problem which has increased rapidly with the development of housing estates, and facility for consuming such refuse in the home, by the use of the ordinary fire, and without sacrifice of space, is now available in a simple and efficient form. This is provided by Wilsons & Mathiesons, Ltd. (Radiation Ltd.), as an integral part of the "Yorkist" combination grate, which has always been noted for the very efficient manner in which it provides the services of cooking, water heating, and room warming.

The disposal of refuse by placing it in a bin which is emptied at intervals of one week or more is unhygienic, and often attracts disease-carrying vermin. The careful housewife sometimes resorts to the burning of rubbish on top of the open fire, but this has the disadvantage of allowing the escape of objectionable and harmful odours into the room. The "Yorkist" refuse destructor has solved this problem, and any type of combustible refuse can now be disposed of in a safe manner with the minimum of trouble. By this means a cheerful fire is maintained, the cooking and water heating remain unaffected, and the danger of objectionable odours passing into the room is completely eliminated.

The destructor is fitted immediately above the block boiler at the back of the fire, and replaces the back brick, and rubble filling previously occupying this space. No additional building space is, therefore, required. The small flue door on the bottom of the front is opened first, then the chamber door (situated above the flue door) is lowered, the refuse charged, either loose or wrapped in paper, and the chamber door closed. The heat from the fire passes through the flue door into the chamber and the refuse is quickly consumed, the odours passing through a flue at the top of the destructor into the main chimney. After the refuse is burned, the ash is simply raked out into the firebox and the lower flue door closed.

There is also available a refuse destructor designed as an independent unit for use with the open fire, which may be installed with or without a back-boiler.

"Donkin" Light Trailer Fire Pump

For A.R.P. the Bryan Donkin Company, Ltd., Chesterfield, have now produced the "Donkin" trailer fire pump, Type F.D.20.

The unit comprises a highly efficient and reliable pump of robust construction, well above its work. The motive power is provided by a standard Austin motor engine with which every motor mechanic is familiar and for which spare parts can be obtained from stock in any district. The engine is cooled indirectly by passing a portion of the water delivered by the pump through a coil in the water tank. A simple and reliable exhaust gas primer is capable of obtaining high suction lifts rapidly without racing the engine. The trailer is of strong construction and can be towed over rough ground without damage. The set is capable of being towed by a small car, taken off the trailer by one man and wheeled like a barrow, or carried over difficult ground.

The "Donkin" trailer fire pump is the result of a long series of stringent tests and is suitable for running continuously for long periods at full duty without undue wear or attention.

Further Crossley Oil Engine Contracts

In addition to the recently reported pumping installations in course of production at Messrs. Crossley Brothers, Ltd., Openshaw, Manchester, the following contracts are also in progress. Their diversity is a real tribute to the well-known adaptability of Crossley oil engines.

One Crossley 6-cylinder vertical Diesel engine, 510 b.h.p., for Tanganyika Central Gold Mines.

Two Crossley 5-cylinder pressure-charged Diesel engines, totalling 660 b.h.p., for Downs Dairies, Australia.

Two Crossley 5-cylinder vertical Diesel engines, totalling 1,000 b.h.p., for Kalabagh Head Works, Punjab.

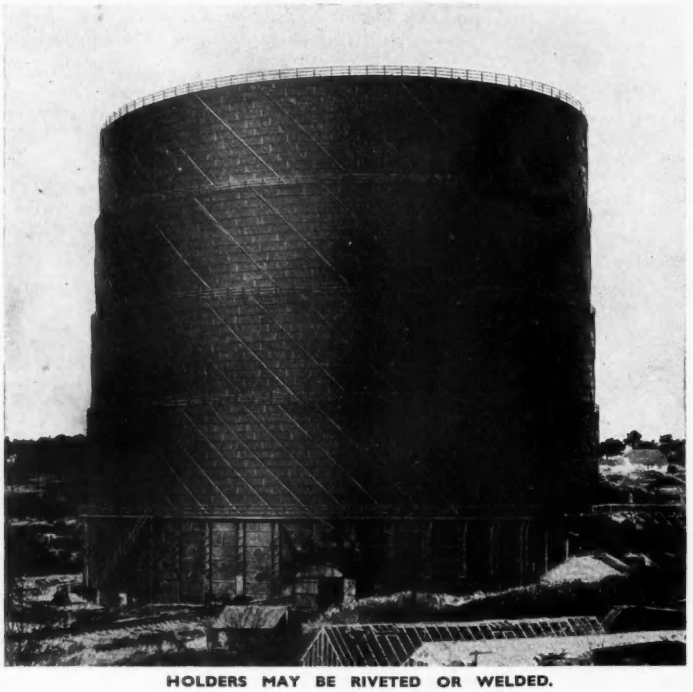
Two Crossley 4-cylinder vertical scavenge-pump Diesel engines, totalling 220 b.h.p. direct-coupled to generators for lighting purposes at Manchester Ship Canal, Eastham Locks.

C. & W. Walkers' Fine Record

At the staff outing of Messrs. C. & W. Walker, Ltd., Midland Iron Works, Donnington, on July 22, long service medals were presented to six members of the staff (one recently retired). The recipients have a total of 319 years' service.

In handing over the medals, Mr. R. J. Milbourne, Chairman and Managing Director, paid a high tribute to the integrity and long and faithful service of the recipients, and said that they had helped, by their devoted application to the business, to maintain the high reputation which the firm had enjoyed during the last hundred years and more.

The staff outing was to Bridgnorth, and the visitors were granted the use of the Bylet Bowling Club to play off the later stages of the competition for the Milbourne Bowl and Challenge Cup. The cup was presented to the winner (Mr. F. H. Johnson) by Mr. Milbourne at a dinner which followed in the Falcon Hotel.



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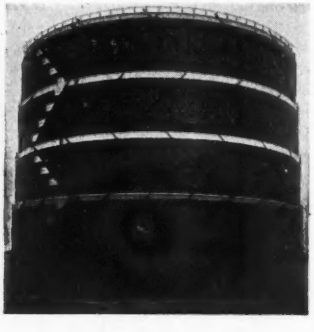
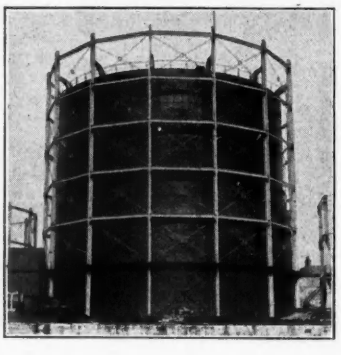
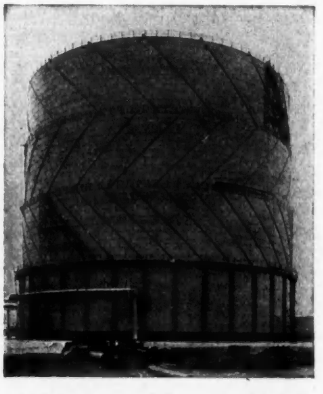


GASHOLDERS

GUIDE - FRAMED
SPIRAL
WATERLESS





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Markets and Manufactures

Current Sales of Gas Products

The London Market

July 31.

Tar Products in the London market have shown no changes in price during the past week. To-day's values are about as follows:—

Pitch, nominal at about 25s. to 26s. per ton f.o.b.
Creosote, 3½d. to 3¾d.
Refined tar, 3¾d.
Pure toluole, 2s. 5d. to 2s. 6d.
Pure benzole, 1s. 9d.
95/160 solvent naphtha, 1s. 7d. to 1s. 8d.
90/160 pyridine, 11s.
All per gallon naked at makers' works.

The Provinces

July 31.

Crude Gas-Works Tar, 10s. to 15s.

To avoid misunderstanding, it is necessary to state that the above price is not claimed to represent a market value. It is a price worked out from week to week upon a system which has been used for many years as a basis for the fixing of certain contracts for crude tar of varying qualities in different areas.

The average prices of gas-works products during the week were: Pitch—East Coast, 25s. to 27s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 25s. to 27s.* Toluole, naked, North, 1s. 10d. to 1s. 11d. Coal tar, crude naphtha, in bulk, North 7¾d. to 8¼d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5d. Heavy naphtha, North, 1s. 2½d. to 1s. 3d. Creosote, *ex* works, in bulk, North, liquid and salty, 3⅞d. to 4⅛d.; low gravity, 4d. to 4½d. Carbolic acid, 60's, 1s. 7d. to 1s. 10d. Naphthalene, £13 10s. to £16. Salts, 70s. to 75s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal, "B" quality unsaleable. Heavy oil: Unfiltered anthracene oil, min. gr. 1,080, 4¾d. to 4⅞d.; filtered anthracene oil, min. gr. 1,080, 5¼d. to 5¾d.; heavy tar oil, gr. less than 1,080, 4½d. to 4¾d.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls, whatever they may be.

Scotland

GLASGOW, July 29.

The market is practically unchanged from last week, although a certain amount of forward business has been arranged. Prices, however, do not show any variation.

Crude gas-works tar.—Actual value is 28s. to 30s. per ton *ex* works in bulk.

Pitch of vertical quality is very difficult to dispose of and large supplies are available at about 20s. to 21s. per ton f.o.b. for export and 20s. per ton *ex* works in bulk for home trade.

Refined tar.—Home deliveries continue to look after production with prices at about 3¼d. to 4d. per gallon. There is still, however, no great movement in export business and prices are 2¾d. to 3d. per gallon, into buyers' packages at makers' works.

Creosote oil is in fair call with values at about the following levels: Specification oil, 3¼d. to 3¾d. per gallon; low gravity, 4¼d. to 4½d. per gallon; neutral oil, 3¾d. to 4d. per gallon; all *ex* works in bulk.

Cresylic acid.—A little more business is being arranged but, as yet, prices show no signs of change. Quotations are approximately as follows: Pale, 97/99%, 1s. 2d. to 1s. 3d. per gallon; dark, 97/99%, 1s. to 1s. 1d. per gallon; pale, 99/100%, 1s. 4d. to 1s. 7d. per gallon; all *ex* works in buyers' packages.

Crude naphtha.—Available supplies command about 5d. to 5¼d. per gallon, *ex* works in bulk, according to quality.

Solvent naphtha.—90/160 grade is 1s. 4d. to 1s. 5d. per gallon and 90/190 heavy naphtha is about 1s. 1½d. to 1s. 2d. per gallon.

Motor benzole is 1s. 3d. to 1s. 4d. per gallon.

Pyridine.—Prices are nominal at 10s. to 10s. 6d. per gallon for 90/160 grade and 12s. to 13s. per gallon for 90/140 grade.

Benzole Prices

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole ...	0	9½	to 0	10		per gall. at works
Motor ,, ...	1	3	,, 1	3½	,,	,,
90% ,, ...	1	4	,, 1	4½	,,	,,
Pure ,, ...	1	8	,, 1	8½	,,	,,

Contracts Advertised

Gasholder.
Blackpool Gas Department. [p. 306.]
Stores.
Bradford Gas Department. [p. 306.]
Coal.
Hanerhill Gas Department. [p. 306.]
Gas Lamp Pillars.
Manchester Gas Department. [p. 306.]
Carbonizing Plant.
Burton-upon-Trent Gas Department [p. 306.]
Coal and Coke Handling Plant.
Burton-upon-Trent Gas Department [p. 306.]

Dividends

Horley District Gas Company announces interim dividends at the rates of 5% per annum on the Preference Stock; 10% per annum on the "A" Capital Stock; and 7% per annum on the Additional "B" Capital Stock for the half-year ended June 30, 1939.

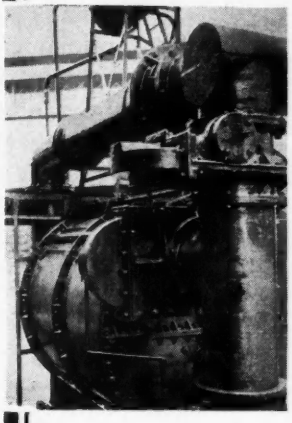
Wandsworth and District.—For the half-year ended June 30, 1939: 2% on the 4% Preference Stock, and 3½% on the Consolidated Stock—viz, at the rate of 4% per annum on the 4% Preference Stock and 6½% per annum on the Consolidated Stock.

Woking District.—In respect of the half-year ended June 30: "A" Ordinary Stock, £11% per annum; "B" Ordinary Stock, £7 4s.% per annum; "C" Preference Stock, £5% per annum, and 4% Preference Stock, £4% per annum.

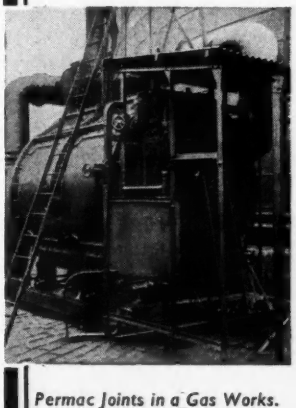
Yorktown (Camberley) and District.—Interim in respect of half-year ended June 30, all less income tax: 5% Consolidated Preference Stock, 5% per annum; 4% Redeemable Preference Stock, 1963/68, 4% per annum, and 5% Standard Consolidated Ordinary Stock, 6% per annum.

South Metropolitan.—Interim of 2½% actual on the Ordinary Stock for the six months ended June 30, 1939 (same). Dividend Warrants will be posted on Sept. 1, 1939.

When a Joint leaks—



Permac Joints in a Gas Works.



Permac Joints in a Gas Works.

Consider the loss in output while the plant is shut down and the joint is being re-made.

"Permac" the original Metal-to-Metal Jointing makes leak-proof joints that last till you want to break them down. Stands up to all temperatures and pressures. Equally successful on steam, gas, water, oil joints.

Send for particulars

Permac
METAL-TO-METAL JOINTING MATERIAL

Sole manufacturers:—

THOMAS & BISHOP LTD
37, Tabernacle St.
LONDON, E.C.2
Telephone: Clerkenwell 3351 (2 lines)

Modern equipment...

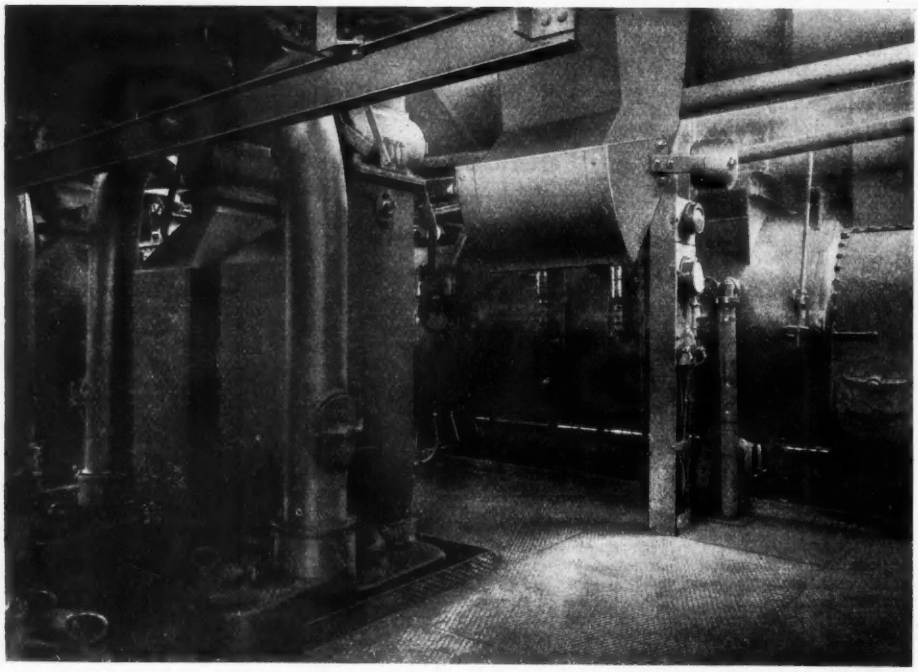
CLEAN OPERATION ... READY ADJUSTMENT OF OUTPUT OF GAS

THE many important requirements of the modern carbonizing plant are given full weight in the Glover-West and West-vertical Systems. Local amenities receive the same careful attention as technical efficiency. West's carbonizing plants are combining these advantages for progressive gas undertakings in 24 countries.

WEST'S

CARBONIZING PLANTS

combine the best advantages of modern retort house practice



Typical equipment at the retort charging level of a Glover-West vertical retort plant for the Buxton Corporation Gas Department.

GAS STOCKS AND SHARES

The revival of confidence continued on the Stock Exchange last week and there was a distinct broadening of business. A firmer tendency developed in the gilt-edged market and British Funds closed fractionally higher The half-yearly statements by the four main railway companies were interesting reading and several of the preference issues gained ground. An expansion of investment buying in the industrial market led to a number of appreciations in value, while the increase in the quota gave a much brighter appearance to the rubber section.

The gas market shared in the increased volume of business, and this was reflected in a hardening of prices among a few leaders. Gas Light units, for instance, moved up 6d. to 21s. 6d., and on the local Exchanges Newcastle units gained a similar amount to 21s., and Bristol rose 1½ points to 108. South Metropolitan and Tottenham ordinaries both closed a point higher. Apart from two falls occasioned by a widening of margins, the only reaction of note was a drop of 3 points in Montevideo stock.

A number of interim or half-yearly dividends were announced during the week and among these were the following: Hornsey 3% on the 3½% stock and 3¾% on the 5% stock—an increase of 3s. 9d.% in both cases. The interim on Croydon sliding scale stock is unchanged at 3½%. As a result of an increase of 0.4d. per therm in the price of gas as from April last, the dividend on the Wandsworth consolidated stock is reduced by ¼% to 3¼%. Watford and St. Albans is distributing £3 7s. 6d.% (against £3 8s. 9d.%), the maximum authorized under the Company's sliding scale provisions. It is satisfactory to note that the sales of gas by this Company during the half-year have increased by 7½%. Woking dividends are the same at 5½% on the "A" stock and £3 17s.% on the "B" stock.

Brighton, Hove and Worthing Gas Company are offering for sale by tender £75,000 4% preference stock, redeemable at par on Dec. 31, 1960, at a minimum of £96 10s.%. Tenders should be in by 12 noon to-morrow, Thursday, Aug. 3.

Official Quotations on the London Stock Exchange

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations July 28.	Rise or Fall on Week.
1,767,439	Mar. 6	8	8	Alliance & Dublin Ord. ...	130—140	...
374,000	June 19	4	4	Do. 4 p.c. Deb. ...	88—93	...
877,576	May 8	5	5	Asscd. Gas & Water U'd'ts Ord.	16/—18/–	...
500,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/—21/–	...
535,545	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	17/—19/–	...
318,730	,,	4	4	Do. 4 p.c. Irred. Cum. Pref.	15/—17/–	– 1/-
75.,000	Mar. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	92—97	...
567,070	Feb. 20	7	7	Barnet Ord. 7 p.c.	150—160	...
300,000	Apl. 6	1/4½	1/9⅝	Bombay, Ltd.	19/—21/–	...
181,185	Feb. 20	9½	9½	Bournemouth Sliding Scale ...	185—195	...
690,526	,,	7	7	Do. 7 p.c. max. ...	153—158	...
493,960	,,	6	6	Do. 6 p.c. Pref. ...	125—130	...
50,000	June 5	3	3	Do. 3 p.c. Deb. ...	70—75	...
362,025	,,	4	4	Do. 4 p.c. Deb. ...	95—100	...
335,000	,,	5	5	Do. 5 p.c. Deb. ...	110—115	...
357,900	Feb. 20	7½	7½	Brighton, &c., 6 p.c. Con. ...	133—138	...
659,955	,,	6¾	6¾	Do. 5 p.c. Con. ...	118—123	...
205,500	,,	6	6	Do. 6 p.c. 'B' Pref. ...	110—115	...
855,000	Mar. 20	7	8	British Ord.	102—112	...
100,000	June 19	7	7	Do. 7 p.c. Pref.	136—141	...
350,000	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...
120,000	June 5	4	4	Do. 4 p.c. Red. Deb. ...	92—97	...
450,000	,,	5	5	Do. 5 p.c. Red. Deb. ...	100—105	...
450,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94	...
100,000	22 May '33	6	4	Cape Town, Ltd.	½—1½	...
100,000	6 Nov. '33	4½	4½	Do. 4½ p.c. Pref.	1—2	...
150,000	June 19	4½	4½	Do. 4½ p.c. Deb.	58—68	...
626,860	July 17	6	6	Cardiff Con. Ord.	112—117*	...
237,860	June 5	5	5	Do. 5 p.c. Red. Deb. ...	102—107	...
98,936	Mar. 20	2/–	2/–	Colombo Ord.	1 5/16—1 7/16	...
24,510	,,	1/4½	1/4½	Do. 7 p.c. Pref.	22/—24/–	...
739,453	Mar. 20	–/11.48	–/11.48	Colonial Gas Assn. Ltd. Ord. ...	16/—18/–	...
296,144	,,	1/3.30	1/3.30	Do. 8 p.c. Pref.	23/—25/–	...
1,775,005	Jan. 23	5	4	Commercial Ord.	51—56	...
140,000	Feb. 6	§13/4	4	Do. 4 p.c. Red. Pref. ...	90—100	– 2½
620,000	June 5	3	3	Do. 3 p.c. Deb.	59—64	...
286,344	Feb. 20	5	5	Do. 5 p.c. Deb.	105—110	...
200,000	,,	§¾	4	Do. 3¾ p.c. Red. Deb. ...	95—100	...
807,560	Feb. 20	7	7	Croydon sliding scale	123—128	...
644,590	,,	5	5	Do. max. div.	94—99	...
620,385	June 19	5	5	Do. 5 p.c. Deb.	107—112	...
208,660	Feb. 20	5	5	Dudley, Brierley Hill & Dist. Ord.	102—107	...
82,275	,,	5	5	Do. 5 p.c. Con. Pref. ...	103—108	...
79,000	,,	3¾	3¾	Do. 3¾ p.c. Red. Deb. ...	95—100	...
239,000	Feb. 6	5	5	East Hull Ord. 5 p.c.	88—93	...
187,215	Feb. 6	6	6	East Surrey Ord. 5 p.c. ...	102—107	...
176,211	June 5	5	5	Do. 5 p.c. Deb. ...	105—110	...
250,000	July 3	4	8	Gas Consolidation Ord. 'B' ...	18/6—20/6	...
250,000	May 22	4	4	Do. 4 p.c. Red. Cum. Pref.	17/—19/–	...
19,189,963	Feb. 6	5½	5½	Gas Light & Coke Ord. ...	21/—22/a	+–/6
2,600,000	,,	3½	3½	Do. 3½ p.c. max.	68—73	...
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref. ...	88—93	...
2,993,000	July 3	3¾	3¾	Do. 3¾ p.c. Red. Pref. ...	90—95	...
8,602,497	May 22	3	3	Do. 3 p.c. Con. Deb. ...	71—76	+1
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb. ...	105—110	...
3,500,000	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	102—107	...
700,000	Mar. 6	3½	3½	Do. 3½ p.c. Red. Ded. ...	90—95	...
270,466	Feb. 20	6	6	Harrogate New Cons.	93—103	...
157,500	Mar. 20	‡1/–	‡1/–	Hong Kong and China Ord. ...	5/8—7/8	...
213,200	Feb. 6	5⅝	6	Hornsey Con. 3½ p.c.	110—115	+2
5,600,000	May 8	8	12	Imperial Continental Cap. ...	110—115	...
172,810	Jan. 23	3½	3½	Do. 3½ p.c. Red. Deb. ...	87—92	...
235,242	Mar. 6	8½	8½	Lea Bridge 5 p.c. Ord.	155—160	...
63,480	June 19	3	3	Maidstone 3 p.c. Deb.	57—62	...
45,000	May 22	†10	†10	Malta & Mediterranean ...	125—130	...
				Metropolitan (of Melbourne) ...		
392,000	Apl. 6	5½	5½	5½ p.c. Red. Deb.	98—103	...
231,977	Feb. 20	5	5	M.S. Utility 'C' Cons.	95—100	...
968,658	,,	4	4	Do. 4 p.c. Cons. Pref. ...	83—88	...
390,076	June 19	4	4	M.S. Utility 4 p.c. Deb. ...	90—95	...
148,955	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...
125,000	July 3	3½	3½	Do. 3½ p.c. Red. Bds. ...	92—95	...
675,000	May 8	†6	†3	Montevideo, Ltd.	52—62	– 3
250,000	Mar. 6	7½	7½	North Middlesex 6 p.c. Con. ...	135—140	...
396,160	Feb. 6	5	5	Northhampton 5 p.c. max. ...	103—108	...
300,000	April 24	†9	†7	Oriental, Ltd.	135—145	...
468,537	June 5	7	8	Plymouth & Stonehouse 5 p.c.	112—117	...
621,667	Feb. 20	8½	8½	Portsmouth & Gosport Cons.	135—145	...
241,446	,,	5	5	Do. 5 p.c. max.	97—102	...
73,350	,,	5	5	Do. 5 p.c. Pref.	102—107	...
75,000	,,	4	4	Do. 4 p.c. Pref.	82—87	...
114,000	Feb. 6	5	5	Preston 5 p.c. Pref. ...	102—107	...
247,966	June 19	4	4	Primitiva 4 p.c. Cons. Deb. ...	95—100	...
625,959	July 17	4	4	Do. 4 p.c. Red. Deb. ...	93—98*	...
15,000	Mar. 6	6	6	San Paulo 6 p.c. Cum. Pref. ...	7⅞—8⅜	...
441,275	May 8	1/1¼	1/1¼	Severn Val. Gas Cor. Ld. Ord.	18/6—20/6	...
460,810	Mar. 20	–/10⅝	–/10⅝	,, ,, 4½ p.c. Cum. Pref. ...	19/—21/–	...
133,201	Mar. 6	8½	5	Shrewsbury 5 p.c. Ord. ...	110—120	...
9,000	June 5	‡4	‡4	South African Ord.	4—5	...
1,996,297	April 24	1/2⅜	1/2⅜	South East'n Gas Cn. Ld. Ord.	20/6—22/6	...
1,000,000	Mar. 6	–/10⅝	–/10⅝	Do. 4½ p.c. Red. Cum. Pref.	19/—21/–	...
769,191	,,	4	4	Do. 4 p.c. Cum. Pref. ...	17/—19/–	
450,000	Feb. 6	4	4	Do. 4 p.c. Deb.	95—100	...
150,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...
6,709,895	Feb. 6	5	6	South Met. Ord.	82—87	+1
1,135,812	,,	6	6	Do. 6 p.c. Irred. Pref. ...	118—123	...
850,000	,,	4	4	Do. 4 p.c. Irred. Pref. ...	85—90	+2
1,895,445	June 19	3	3	Do. 3 p.c. Deb.	68—73	...
1,000,000	July 17	5	5	Do. 5 p.c. Red. Deb. ...	103—108*	...
600,000	,,	3¾	3¾	Do. 3¾ p.c. Red. Deb. ...	92—97*	...
1,543,795	Jan. 23	6	6	South Surburban Ord. 5 p.c. ...	103—108	...
512,925	,,	5	5	Do. 5 p.c. Pref.	103—108	...
500,000	,,	4	4	Do. 4 p.c. Pref.	85—90	...
250,000	,,	3¾	3¾	Do. 3¾ p.c. Red. Pref. ...	90—95	...
888,587	June 5	5	5	Do. 5 p.c. Deb.	107—112	...
250,000	,,	4	4	Do. 4 p.c. Deb.	89—94	...
200,000	Feb. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...
427,859	Apl. 6	9⅜	1/2⅜	S. Western Gas & Water Ord.	15/—17/–	...
160,523	Apl. 6	–/10⅝	–/10⅝	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...
110,000	June 5	4	4	Do. 4 p.c. Red. Deb. ...	92—97	...
750,541	Feb. 6	5	5½	Southampton Ord. 5 p.c. ...	102—107	...
148,836	June 5	4	4	Do. 4 p.c. Deb. ...	89—94	...
350,000	Feb. 6	5½	5½	Swansea 5½ p.c. Red. Pref. ...	104—109	...
200,000	June 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94	...
1,076,490	Feb. 20	6½	6½	Tottenham and District Ord....	107—112	+1
409,835	,,	5½	5½	Do. 5½ p.c. Pref.	110—115	...
62,235	,,	5	5	Do. 5 p.c. Pref.	102—107	...
453,380	June 19	4	4	Do. 4 p.c. Deb.	87—92	...
85,701	June 5	6	6	Tuscan 6 p.c. Red. Deb. ...	95—100	...
1,247,505	May 8	4	6	U. Kingdom Gas Cor. Ord. ...	15/6—17/6	...
1,085,952	May 8	4½	4½	Do. 4½ p.c. 1st Cum. Pref. ...	17/—19/–	...
772,709	,,	4	4	Do. 4 p.c. 1st Red. Cum. Pf.	17/6—19/6	...
745,263	June 5	4½	4½	Do. 4½ p.c. 2nd Non-Cum. Pf.	13/6—15/6	...
1,093,656	Mar. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	92—97	...
378,106	Mar. 6	7	7	Uxbridge, &c., 5 p.c.	120—125	...
133,010	,,	5	5	Do. 5 p.c. Pref. ...	102—107	...
1,371,138	Jan. 23	7	7	Wandsworth Consolidated ...	108—113	...
2,525,768	,,	4	4	Do. 4 p.c. Pref.	83—88	...
1,343,964	June 19	5	5	Do. 5 p.c. Deb.	107—112	...
383,745	,,	4	4	Do. 4 p.c. Deb.	89—94	...
400,000	,,	3¾	3¾	Do. 3¾ p.c. Red. Deb. ...	92—97	...
558,342	Feb. 6	6¼	6¼	Watford and St. Albans Ord. ...	105—115	– 2½
200,000	,,	5	5	Do. 5 p.c. Pref.	102—107	...
200,000	,,	5½	5½	Do. 5½ p.c. Pref.	108—113	...
200,000	,,	§16/8	4	Do. 4 p.c. Rd. Pf. (1973/8)	93—98	...
100,000	—	—	—	Do. 4 p.c. Red. Pf. (1959)	97—102	...
200,000	June 19	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...
200,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	83—88	...

a.—The quotation is per £1 of Stock. * Ex. Div. † Paid free of income-tax. ‡ For year. § Actual.

Supplementary List and Provincial Exchanges overleaf.

STOCK AND SHARE LIST—Contd.

Supplementary List, not Officially Quoted, London

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations July 28.	Rise or Fall on Week.
202,152	Mar. 20	5	5	Ascot Ord.	97—102	...
128,182	July 3	5	5	Do. 5 p.c. Pref.	101—106	...
31,035	Mar. 20	-/4⅛	-/4⅛	Associated Utilities 4 p.c. Pref.	15/—17/-	...
100,000	June 19	3⅛	3⅛	Do. 3½ p.c. Red. Deb. ...	93—98	...
17,000	Feb. 20	8	8	Bognor Orig. Ord. 'A' ...	140—150	...
62,210	,,	8	8	Do. New Add. 'A' ...	140—150	...
87,160	,,	7	7	Do. New 7 p.c. max. ...	135—145	...
37,440	Feb. 6	10	10	Cam. Univ. & Town 10 p.c. max.	165—175	...
125,970	,,	7	7	Do. 7 p.c. max.	115—125	...
39,025	,,	5	5	Do. 5 p.c. max.	95—100	...
96,410	July 17	4½	4½	Cardiff 4½ p.c. Pref.	92—97*	...
55,520	Feb. 6	6	6	Colchester 6 p.c. Pref.	115—120	...
90,550	Mar. 20	5	5	Do. 5 p.c. Deb. ...	103—108	...
150,000	Feb. 20	4	4	Croydon 4 p.c. Pref.	86—91	...
130,000	June 19	4	4	Do. 4 p.c. Deb.	90—95	...
65,000	Mar. 6	7½	7½	Eastbourne 'A' 5 p.c.	122—132	...
198,000	,,	6	6⅔	Do. 'B' 3½ p.c.	105—115	...
112,312	,,	5	5	Do. 5 p.c. Pref.	102—107	...
130,000	June 19	5	5	Do. 5 p.c. Deb.	105—110	...
130,500	Feb. 20	7½	7½	Exeter New Ord. (£10) ...	13½—15⅔	...
24,000	Feb. 20	8½	8½	Gt. Yarmouth 8½ p.c. max. (£30)	25—30	...
59,400	,,	7½	7½	Do. 7½ p.c. max. (£30) ...	27—32	...
51,160	June 5	5½	5½	Do. 5½ p.c. Deb.	115—120	...
152,600	Feb. 20	8	9	Guildford Cons.	150—160	...
54,055	,,	5	5	Do. 5 p.c. Pref.	102—107	...
68,250	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
156,600	Feb. 20	7	7	Hampton Court Cons. ...	103—113	...
86,046	June 19	‡4½	‡5	Holyh'd&N.W.G.&W.Cpn.Ord.	13/6—15/6	...
80,000	Mar. 6	4	4	Lea Bridge 4 p.c. Pref.	83—88	...
60,000	,,	6	6	Do. 6 p.c. Pref.	125—130	...
94,876	June 5	4	4	Do. 4 p.c. Deb.	87—92	...
73,620	Mar. 6	8⅔	8⅔	Luton Cons. 'A'	150—160	...
107,960	Mar. 20	4	5⅛	Mid Kent Ord. (£10)	8⅛—9⅛	...
230,940	Feb. 6	10	10	Oxford & District Ord. ...	160—170	-2
47,112	,,	5	5	Do. 5 p.c. Pref.	98—103	...
50,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	108—113	...
126,193	May 8	7½	7½	Peterborough Ord.	134—139	...
64,990	Mar. 6	7½	7½	Redditch Ord.	115—125	...
166,850	Feb. 6	8	8	Romford Ord.	137—142	...
60,000	,,	4	4	Do. 4 p.c. Pref.	97—102	...
44,000	Mar. 20	5	5	Do. 5 p.c. Deb.	107—112	...
25,570	Feb. 6	5¼	5¼	Rugby 5¼ p.c. Pref.	118—123	...
25,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	103—108	...
42,750	June 5	5½	5½	Do. 5½ p.c. Deb.	113—118	...
110,950	Feb. 20	8	8	Ryde Ord.	137—147	...
270,086	Mar. 20	7	7	Slough Ord.	120—130	...
21,000	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
28,872	May 8	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	16/—18/-	...
28,866	Mar. 6	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	17/—19/-	...
117,228	Feb. 20	5	7	Swindon Cons.	100—105	...
60,425	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
64,380	June 19	5	5	Torquay & Paignton 5 p.c. Pref.	102—107	...
130,000	Feb. 6	5	8	Wakefield Ord.	105—115	...
81,650	,,	5	5	Do. 5 p.c. max.	90—95	...
82,000	Jan. 23	6	6	Weymouth Ord.	101—106	...
273,626	Feb. 6	7	7	Wolverhampton Cons. Ord. ...	129—134	...
98,384	Feb. 6	6	6	Do. 6 p.c. Pref.	115—120	...
160,000	June 19	5½	5½	Do. 5½ p.c. Red. Deb. ...	102—107	...
106,490	Mar. 20	5½	5½	Wrexham Ord.	91—96	...
90,000	June 19	5	5	York 5 p.c. Red. Deb.	102—107	...
133,640	Feb. 20	6¼	6¼	Yorktown (Cam.) 5 p.c. Cons.	115—120	...
120,000	,,	5	5	Do. 5 p.c. Pref.	102—107	...
35,000	June 19	5½	5½	Do. 5½ p.c. Deb.	110—115	...

BRISTOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations July 28.	Rise or Fall on Week.
347,756	Feb. 6	5	6	Bath Cons.	115—117	...
1,667,250	Feb. 6	5	5	Bristol, 5 p.c. max.	107—109	+1½
120,420	June 5	4	4	Do. 1st 4 p.c. Deb.	96—100	...
415,250	,,	4	4	Do. 2nd 4 p.c. Deb. ...	96—100	...
328,790	,,	5	5	Do. 5 p.c. Deb.	113—116	...
274,000	Feb. 20	5	5	Newport (Mon.) 5 p.c. max. ...	95—97	...
13,200	Mar. 20	7	8⅔	Pontyp'l Gas & W. 10 p.c. 'A'	12⅝—13½	...
13,600	,,	6	5	Do. 7 p.c. 'B'	10½—11½	...
40,000	,,	6	5	Do. 7 p.c. 'C'	10½—11½	...
140,778	Feb. 6	5	5	Weston-super-Mare Cons. ...	103½—105½	...
64,338	June 19	4	4	Do. 4 p.c. Deb.	97—99	...
33,340	,,	7½	7½	Do. 7½ p.c. Deb.	146—150	...

LIVERPOOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations July 28.	Rise or Fall on Week.
157,150	Feb. 6	5	6½	Chester 5 p.c. Ord.	107—110	...
92,500	June 5	4	4	Do. 4 p.c. Pref.	94—98	...
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	86—89	...
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	96—100	...
2,167,410	Feb. 20	6	6	Liverpool 5 p.c. Ord.	114—116	-1
245,500	June 19	5	5	Do. 5 p.c. Red Pref. ...	100—105	...
306,083	July 17	4	4	Do. 4 p.c. Deb.	99—101	...
106,280	Feb. 6	10	10	Preston 'A' 10 p.c.	177—187	...
188,219	,,	7	7	Do. 'B' 7 p.c.	129—139	...

NEWCASTLE EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations July 28.	Rise or Fall on Week.
122,577	Feb. 20	8	8	Blyth 5 p.c. Ord.	149—151	-7½
732,000	Feb. 20	3	3	Hartlepool G. & W. Cn. & New	76—78	...
2,061,315	Feb. 6	5	5¾	Newcastle & Gateshead Con.	20/9—21/3a	+-/6
682,856	,,	4	4	Do. 4 p.c. Pref.	88—89	...
776,706	June 5	3½	3½	Do. 3½ p.c. Deb.	85½—87½	...
277,285	April 24	5	5	Do. 5 p.c. Deb. '43 ...	101—103	...
332,351	Feb. 6	6	6	Sunderland 6 p.c. max. ...	129—131	...

NOTTINGHAM EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations July 28.	Rise or Fall on Week.
542,270	Feb. 6	6	9	Derby Con.	132—137	...
55,000	June 19	4	4	Do. 4 p.c. Deb.	100—105	...
20,000	June 19	5	5	Long Eaton 5 p.c. Pref. ...	10—12	...
80,000	,,	5	5	Do. 5 p.c. Deb. ...	102—107	...

SHEFFIELD EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations July 28.	Rise or Fall on Week.
10,000	Feb. 6	10	10	Great Grimsby 'A' Ord. ...	180—190	...
6,500	,,	10	10	Do. 'B' Ord. ...	180—190	...
79,000	,,	10	10	Do. 'C' Ord. ...	175—185	...
1,806,339	Feb. 20	6½	6½	Sheffield Cons.	137—140	...
95,000	July 3	4	4	Do. 4 p.c. Deb.	99—101	...

a The quotation is per £1 of Stock.
* Ex. div. ‡ For year.

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